EVALUATION OF HONDURAN FORESTRY COOPERATIVES: FIVE CASE STUDIES

BY

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Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN FORESTRY

MICHIGAN TECHNOLOGICAL UNIVERSITY

2003

The project paper "Evaluation of Honduran Forestry Cooperatives: Five Case Studies" is hereby approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE IN FORESTRY.

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LIST OF ACRONYMS AND SPANISH TERMS

1. ADECAF-Apoyo al Desarrollo de Cooperativas Agroforestales (Support for Development of Agroforestry Cooperatives)

2. AFE-Administración Forestal del Estado (State Forest Administration)

3. AFOCO-Apoyo a la Forestería Comunitaria (Support for Community Forestry)

4. *Campesino*-peasant or person who lives in a rural area.

5. CHC-Consejo Nacional de Coopertivas (National Cooperatives Council)

6. CICAFOC-Consejo Indígena y Campesina Agroforestal de Centro América (Central American Indigenous and Peasant Agroforestry Council)

7. COHDEFOR-Corporación Hondureña de Desarrollo Forestal (Honduran Forestry Development Corportation)

8. *Convenio de usufructo*-Usufruct contract. Guarantees tenure rights over assigned forest areas for coopertives.

9. *Ejidal*-Communal. Refers to comunal land that is managed by municipalities.

10. EMCAH-Empresa de Mercadeo y Comercialización Agroforestal Hondureña (Honduran Agroforestry Marketing and Commercialization Company)

11. *Finca*-Farm or plantation. Large coffee plantations are typically called *fincas.*

12. *Fondo de Manejo Forestal*-Forest Management Fund. Committee set up in Quebrada Honda to monitor cooperative and collect a small tax for use in reforestation and forest fire protection.

13. *Fondo de Resina*-conglomerate resulting from the merger of the three resin processing plants in Honduras.

14. FEHCAFOR-Federación Hondureña de Cooperativas Agroforestales (Honduran Federation of Agroforestry Cooperatives)

15. FINACOOP-Financiera de Cooperativas (Financing Group for Cooperatives)

16. IHC-Instituto Hondureño de Cooperativas (Honduran Institute of Coopertives)

17. *Lempira*-Honduran unit of currency. 17.7 Lempiras = $1 (2003)

18. MAFOR-Manejo y Utilización Sostenida de Bosques Naturales de Coníferas en Honduras (Sustainable Management and Utilization of Natural Conifer Forests in Honduras)

19. *Maquiladora*-Factory, usually foreign-owned. They produce a lot of clothing in Honduran *maquiladoras.*

20. *Mozo*-Laborer or day-laborer. Often hired temporarily to help with crops or tap resin.

21. *Patronato*-Village council.

22. *Resinero*-Resin tapper or member of a cooperative who taps resin.

23. SSF-Sistema Social Forestal (Social Forestry System)

24. *Venta local*-Local sale. Formerly a common meted of selling logging contracts.

ACKNOWLEDGEMENTS

Many different individuals have been influential throughout the course of this study. I would like to thank Ronald Gratz, Chandrashekhar Joshi, and James Pickens, who as members of my committee showed incredible patience and flexibility during my four years in Honduras and the brief time I spent at Michigan Tech writing and defending my paper. I especially want to thank my committee chair, Blair Orr, whose support and hard work given while I was abroad and back at Tech were second to none. Extras like a wedding gift sent to Honduras and revising this entire paper numerous times in the space of a month were greatly appreciated.

I want to thank my APCD from Peace Corps Honduras, Jorge Betancourt. Your support and friendship have been unwavering during and after my service. It was an honor to have worked under someone so dedicated to Honduras and its people. I also want to thank Peace Corps Honduras staff members Ronald Ruybal, Jutta Bayer, and Maggie Zelaya for their support during a difficult time during my third year of service.

It would be impossible to list all the Hondurans that deserve recognition for their help or friendship during my Peace Corps service. I thank every person who ever invited me into their home, allowed me to work alongside them, or shared a conversation with me. Your warmth and generosity are what made Honduras my second home. I want to specifically thank several people. From the villages of Laínez, Chaguite Oriente, and Los Tablones, I thank Reynaldo Solórzano, Jr., Andrés Solórzano and family, Jorge Nolasco, Donaldo Nolasco, Pedro Palma, and Santos Sierra. From Proyecto AFOCO, I thank Francisco Borjas and Rolando Ordoñez. From the FEHCAFOR/EMCAH team, I thank Sarah Lagos, Andrés Solórzano, Javier Chrinos, Henry Ferrufino, Roberto Hernandez, and Victoria Flores. I am also grateful to all those from the cooperatives and communities included in this study who contributed information in any way.

I thank John Gehring from Benzie Central High School who always encouraged my questions and who remains the best teacher I have ever known. I also thank J. Dan Skean from Albion College who has been a friend and mentor. He also recommended that I attend the Blair's presentation on the Master's International Program. It does keep getting better. I would like to thank the many PCVs who made Honduras an unforgettable experience. These include; Luke Dunnington, Gavin Green, Juan Cristiani, Mark Moreira, Hamilton Hodgeman, Hung Pham, Mark Ellis, Nora Peña, Leila Middlefort, Heather Jameson, Mike Carbone, Luke Roberts, Bernard Frankl, and anyone else who ever shared a bus or a beer with me. You know who you are. I would specifically like to thank Susan Stolpe and Daniel P. Neely for being my Yuscarán support group. Thank you all.

I would like to thank my wife Carolina for her love and support. Seeing you in Honduras after finishing made everything worth it. *Te quiero vos*. Lastly, I thank Derryl and Christine, the best parents I could have asked for. Your love and sacrifices have made me who I am. I am forever grateful.

ABSTRACT

Case studies were done on five Honduran agroforestry cooperatives. A comparative analysis of the five case studies was utilized to determine the factors most important for success or failure of a cooperative. The case studies yielded eleven focus areas of importance: forest resource base, land tenure, structure and functionality, benefits for cooperative members and communities, institutional support, international aid projects, pine bark beetle, resin tapping, logging, processing and marketing of timber, and integration of logging and resin tapping.

The quality of forest resource base possessed by a cooperative was found to have little influence on success in the cooperatives studied. Land tenure was determined to be of utmost importance for the survival of cooperatives. Two factors, obtaining initial tenure rights, and defending those rights, were identified as most critical. Under structure and functionality, groups with better participation and communication between cooperative members enjoyed the most success. Boards of Trustees were found to function inadequately in some study groups, which is an area for improvement. Benefits received by cooperative members and communities from the cooperatives were defined as incentives for cooperative development. Institutional support for cooperatives by government entities was found to be inadequate in many cases, and a general distrust of important government entities was noted within the cooperatives. The positive and negative aspects of participation by cooperatives with international aid projects were discussed. Planning and participation were identified as areas for improvement for the projects. Recent forest losses due to pine bark beetle infestations will have profound effects on some cooperatives. Various threats to continuance of resin tapping were identified including silvicultural methods, exhaustion of tree plots, and poor market conditions. Diversification of cooperatives into logging, log processing, and lumber marketing were shown to cause difficulties for cooperatives. Introduction of logging without full participation by cooperative members caused division within some groups. Operating logistics and management skills presented challenges for the cooperatives, and are both areas that can be addressed with increased training and interchange between cooperatives. Resin tapping does not appear to be feasible in the long term without logging to remove trees that can no longer be tapped. Therefore, integration of resin tapping and logging activities was argued to be of paramount importance for long-term sustainability of the cooperatives. New management systems are needed which optimize production of both products, rather than timber only.

INTRODUCTION

Honduras possesses a comparatively advanced Social Forestry System which originated in the mid-1970s. Within the system, rural communities are given rights to manage and protect forest lands near their communities. The system was created to deter the continuing destruction of forest resources in Honduras and to promote development of rural communities. The majority of communities that participate in the Social Forestry System do so through agroforestry cooperatives, many of which were founded and trained with support of COHDEFOR (Honduran Forest Development Corporation) immediately following the formation of the government agency in 1974. The system is backed by formal laws and has functioned for three decades. This success makes the Social Forestry System of Honduras the most developed of all its neighbor countries. The system and many of the first cooperatives founded within it are still functioning. In addition, new communities are continually becoming involved. The purpose of this study was to examine the history of these groups as well as their current status to determine the strengths and weaknesses of the groups. This is important for the improvement of existing cooperatives and the establishment of new ones.

Honduras is a mountainous country with a total land area of 111,890 km^2 (FAO, 1999). It is estimated that only 12.3% of the total land area is well-suited for agriculture (Silviagro, 1996). The remainder of land in Honduras is better suited for forest production due to slope, soil depth, and rockiness. Of the total land area, 4,115,000 hectares, or 36.8 %, are forested (FAO, 1999). The forest area consists of 48.4% broadleaf forest, 42% pine forest, and 9.3% mixed pine and broadleaf forest (FAO, 2001). Because of the difficulty of planting crops on forest land, most of these areas

remained forested until the beginning in the twentieth century when population pressure and landlessness forced large numbers of *campesinos* into the frontier areas and mountainsides to farm. Much of this movement was the result of severe land degradation in the southern region of Honduras, which was traditionally the primary agricultural region of the country. This, coupled with a growing population, forced many families to migrate to other areas of the country in search of land.

As a result of increased population and migration, deforestation rates have increased. Average annual deforestation between 1964 and 1990 was 1.1% (COHDEFOR/OEA, 1992 as cited in Molina, 1997), and from 1990 to 1995 that figure rose to 2.3% or 102,000 hectares per year (FAO, 1999). Natural forest lands have borne the brunt of this destruction as they are converted to crop and pasture lands by migrating *campesinos*. Other threats to forests are incessant fires and logging activities, both legal and illegal. Prior to the 1970s, *campesinos* were never legally allowed to take advantage of the abundant forest resources the country held. Forestry activities, specifically logging, had been the domain of foreign and domestically-owned businesses for all of the early history of Honduras.

SOCIAL FORESTRY SYSTEM BECOMES LAW

In 1974, the Honduran National Congress passed Law 103 which created COHDEFOR, the Honduran Forest Development Corporation. Prior to 1974, most forest exploitation was dominated by foreign owned companies. The new law specified that all forests were the property of the state even on private or communal land. COHDEFOR was given exclusive rights to lumber exports, and state lumber companies were

constituted to handle harvesting and processing. COHDEFOR and the state companies came to dominate the forestry sector in Honduras. Harvesting permits were still sold to private companies, but at a smaller scale than to the state companies.

The law also mandated the creation of a "Social Forestry System," which was supposed to involve rural communities in forest management. The logic behind the system was that rural communities living within forested areas were the people in the best position to protect and take care of the forests. Many have suggested that giving groups exclusive common property rights as opposed to free access for all can be an effective tool for forest management (Stanley, 1991a and 1991b; McKean & Ostrom, 1995; Richards, 1993 and 2002). Bromley (1989) states that "A common property regime is not a situation of open access; common property has a well-defined group of authorized users, a well-defined resource that the group will manage and use, and a set of institutional arrangements with rules of use for the resource." By involving them in forest management and allowing them to benefit from the forest, it was hoped that the communities would actively protect the forest from fires, overgrazing, illegal logging, and migratory agriculture.

The law stated that any groups of community members organized as part of a legally recognized institution could participate in the system. The law did not define exactly which institutions were legal and appropriate. The law did not specify the manner in which the communities would be able to participate in forest management. As in all other matters concerning forest management, COHDEFOR had the last word. The system which COHDEFOR eventually promoted was the formation of agroforestry cooperatives. This system was most heavily promoted in areas of pine forest, and the

activity they promoted for the cooperatives was tapping the pine trees for resin. Cooperatives also formed in some areas of broadleaf forest. These groups were given permission to harvest small volumes of trees and convert them to lumber in the forest using pit sawing techniques.

Technicians from COHDEFOR were sent into the field to identify potential groups and train them. New cooperatives received technical and organizational training, monetary assistance for obtaining legal recognition as cooperatives, loans for buying equipment, and were assigned areas of forest where they would collect resin. Cooperatives must register with the Honduran Institute of Cooperatives (IHC) to be legally recognized. COHDEFOR never guaranteed that the areas assigned to the cooperatives could not be auctioned or harvested by COHDEFOR or other entities in the future.

The development of the resin cooperatives gave rise to a parallel development of three Honduran resin processing plants: Complejo Industrial Comayagua, Resinera Maya, and Resinera Bahr (ADECAF, 1998). The cooperatives sold resin to these three companies which existed in independent competition during the 1970s and 1980s. The prices paid to the cooperatives in this period reflected the fluctuations in world market prices for crude resin. In 1990, the three processors joined forces to control the Honduran resin market, focusing on prices paid for crude resin. This new conglomerate was called the Fondo de Resina, and the cooperatives had to deal directly with the Fondo in order to sell their resin.

During the 1980s, some resin cooperatives were successful and were able to invest in their communities. Some cooperatives built water projects, schools, community

centers, and better roads in their communities. Some groups also invested profits from resin sales in infrastructure and property for the cooperative. Meeting houses were built, trucks for hauling resin were purchased, and some groups even diversified their income-generating activities. Examples of diversification include cooperative-owned stores, firewood and charcoal production, and timber harvesting. Successful groups also began offering credit or other additional benefits to their members. The most successful groups expanded while other groups failed within a few years. There were many reasons for failure. Among these were lack of support from COHDEFOR or municipalities, logistical difficulties, and corruption within the cooperative leadership or supporting agencies. Nearly all cooperatives went through crises in the first ten or fifteen years of their existence. Some survived the crises, and some did not.

Forestry in Honduras underwent radical changes in 1992 when the Agricultural Sector Development and Modernization Law was passed. Since its inception, COHDEFOR had maintained a near monopoly in harvesting, processing, and exporting lumber. In 1985, the monopoly on exports was repealed. The new law mandated further reductions in COHDEFOR's authority. State-owned harvesting and processing companies were closed or privatized. Control of private and communal forests was given back to land owners. COHDEFOR was downsized and the acronym AFE (State Forest Administration) was added to COHDEFOR to emphasize its new role as merely the administrators of the national forests. Management plans and annual operational plans were required for all harvesting activities in national, communal, or private forests. Plans in national forest were to be developed by AFE/COHDEFOR, but private and communal

land owners were responsible for their own management plans. AFE/COHDEFOR's new role was to approve management plans and monitor their implementation.

These changes obviously affected the agroforestry cooperatives. The cooperatives had to have a management plan in order to operate. For cooperatives working in national forests, they would have to work with AFE/COHDEFOR to develop a plan for their forests. For those working in communal or private forests, they would have to arrange with the land owner to develop plans. Other clauses in the law applied specifically to the groups of the Social Forestry System. For example, the law placed a limit on the volume of timber a cooperative could harvest per year. For cooperatives in pine forest, they were allowed to harvest 1000 m^3 per year, and in broadleaf forest, they were allowed to harvest 200 m^3 per year.

One section of the law contained clauses that were intended to reaffirm and strengthen the Social Forestry System. One clause specified that groups with three or more years experience working successfully in forestry activities would earn the right to a *convenio de usufructo* (usufruct contract). This document gives a cooperative secure property rights for a defined period, usually 40 years. It was an attempt to prevent cooperatives from losing their forest areas to outside interests. The law also specified that groups operating under the Social Forestry System would have access to credit through AFE/COHDEFOR to form new groups or finance management activities in the forests. The law mentions that the cooperatives were to utilize rural banking institutions which were being established in that time period by a different government project.

LAND TENURE

The forest land where most cooperatives operate is national forest (owned by the central government and administered by COHDEFOR) or *ejidal* forest (communal land which is administered by municipal governments). A small percentage of cooperatives or individuals within cooperatives operate on private land. In order to tap resin or harvest timber on national forest land, cooperatives must get permission from COHDEFOR and pay tax or stumpage for the products extracted. In *ejidal* forests, the municipal government grants permission and collects taxes, although COHDEFOR still must approve the activities. For any forest management or harvesting activity to be approved by COHDEFOR, cooperatives must have a management and annual operational plan for their activities. Plans for resin tapping only are less complex than timber plans. For individuals that work on private land, the *resinero* usually negotiates an agreement with the landowner specifying how many trees he can tap and how much will be paid to the landowner.

ORGANIZATIONS LINKED WITH THE SOCIAL FORESTRY SYSTEM

The most important organization the cooperatives deal with regularly is COHDEFOR. The original law which constituted COHDEFOR gave it power over all forests in the country regardless of who owned the land. The agricultural modernization law reduced COHDEFOR's power, but all cooperatives that work on national and municipal land must collaborate with COHDEFOR. Within the agency, there is a separate social forestry division whose job is to monitor and support social forestry

groups. If a cooperative works on national forest land, they must work directly with COHDEFOR in developing plans and developing forest-related activities. The cooperative pays COHDEFOR stumpage and other fees for products taken from the forest. In the case of communal and private land, COHDEFOR does not collect substantial fees, but they must approve all plans and activities.

Cooperatives must also collaborate with municipal governments. In Honduras, municipalities include the rural communities surrounding the municipal seat in addition to the urban area of the municipality. The size of Honduran municipalities varies, but the *alcalde*, or mayor, of each municipality has extensive powers over communities and land within the municipality. The municipality's authority depends on the tenure of the land in question. In cases where a cooperative works on national forest land, the municipality has little involvement and may only charge a small tax on resin or other products harvested. They have no control over forest management or extractive activities. If the forest is *ejidal* (communal), the municipality has the primary role in the management and monitoring of forest activities. Some municipalities with large communal forest holdings hire foresters to manage their forests. The municipality, instead of COHDEFOR, charges stumpage fees and resin taxes to the cooperatives on communal land.

FEHCAFOR (Honduran Federation of Agroforestry Cooperatives) is a federation of groups which work under the Social Forestry System. FEHCAFOR's membership includes over 70 groups, the majority of which are cooperatives. FEHCAFOR was founded in 1974, and its primary role is promoting and defending the position of the community forestry groups to the government, COHDEFOR, and other national agencies and federations. Other areas of support provided by FEHCAFOR are training, marketing

services, and loans for cooperatives. Recently, FEHCAFOR participated in the work group which drafted the proposed new forestry law which is awaiting approval by the Honduran government. The federation was also given a grant from the Ford Foundation to be used for institutional strengthening and training for the cooperatives.

Development projects financed by foreign governments such as the United States, Germany, Canada, Finland, and the Netherlands also influence the Social Forestry System greatly. The focus of many recent projects has been developing management plans and training cooperative members in timber harvesting and wood processing. For many groups, this has been a departure from the status quo of working only in resin tapping. This and the myriad of other problems in these communities have been an enormous challenge for the projects. Within the realm of the international development projects, there are as many different approaches to working with social forestry groups as there are projects. They have experienced varied levels of success.

EMCAH (Honduran Agroforestry Cooperative Marketing Association) was an idea promoted by the FAO/Netherlands-sponsored project ADECAF. The concept stemmed from the difficulties experienced by the cooperatives in marketing their products. EMCAH is a forest products marketing company owned by a group of agroforestry cooperatives. EMCAH buys resin and lumber from the cooperatives and sells them domestically or internationally. The company seeks to ameliorate the problems normally encountered by cooperatives in marketing their products. EMCAH is able to concentrate its efforts solely on selling what the cooperatives produce and at the same time have a stronger negotiating position than individual cooperatives would have acting alone.

RESIN TAPPING

For the early pine forest cooperatives in the Social Forestry System, resin tapping has been an extremely important activity. Most members of resin cooperatives are subsistence farmers who receive no cash income from their farming activities. Income earned from resin tapping is the only source of cash they have. Resin tapping also fits in well within the work obligations of *campesinos*. The best time for tapping pine resin is in the dry season when farmers do not plant crops. The time spent tapping resin does not interfere with their capacity to grow food for their families. Prior to the existence of the Social Forestry System, resin tapping was an artesian activity practiced by a very few communities in rural areas. The resin was used locally for soap making, medicine, wood curing, glue, pesticide, and patching leaks (ADECAF, 1998) A few crude processing operations existed at the time, but much of the resin was used locally. The first resin cooperative was the Cooperativa San Juan de Ojojona, which was founded in 1946 to produce raw material for the first industrial processing plant, Resinera Bahr. The number of organized resin producing groups remained small until COHDEFOR began promoting resin cooperatives and the Social Forestry System.

In the majority of resin cooperatives, individual members who tap resin (*resineros*) have their own plot where they tap trees. The size of the plots and the number of usable trees within the plots varies from 2 to 20 hectares and 400 to over 3000 trees per plot. Within the communities, resin plots are recognized as property of the *resinero*. Plots are regularly sold between members, and they are commonly inherited within families. Some *resineros* have even managed to obtain legal titles to their plots. In

addition to tapping the trees for resin, the *resineros* use the land for other purposes such as grazing or planting crops.

The *resineros* work individually collecting the resin from the trees in their plots, although owners of large plots may pay workers to do all or part of the collecting. Many times resin tapping is a family affair, with the father and all or some of the male children contributing. Older sons are often given full responsibility for working the family plot. Hired workers or family members working in resin tapping may or may not be actual members of the cooperative. Some cooperatives require that members actually own a forest plot. Others cooperatives, especially those that have diversified their activities, allow new members to join that do not own resin plots.

The most common method used to tap pine trees in Honduras is called the cup and channel method (Figure 1). This was the method COHDEFOR promoted when training cooperative members to tap resin in the 1970s. The *resinero* begins at the bottom of the tree, nailing two pieces of metal channel, called the *canal* and *delantal*, to the tree along with a plastic or metal cup which collects the resin. Above the channel, an angled wound is scored the width of the collection channel through the bark and cambium. The scored area of the tree is called the face. The tool used in scoring the tree is called an *espada*, and each time the tree is scored is called a *pica*. A solution of sulfuric acid is applied to the exposed wood, which heats it and promotes faster resin flow. As the *resinero* continues scoring the tree continuously over a long period of time, the face moves higher up the tree until the *resinero* cannot reach any higher. *Resineros* typically score trees every two or three days, depending on the number of trees being worked, the time of year, and the flow of resin. Most commonly, after two *picas*, the

resinero empties each cup in his plot. They usually carry the resin in buckets which is transferred to small barrels or containers carried by horses, mules, or donkeys.

Figure 1. Cup and channel resin tapping method

The resin is then brought to central collection points and put into large plastic barrels in which the resin is transported to the processing factory. Several *resineros* each have barrels at a collection point (Figure 2). When there are enough members with full barrels, the cooperative will hire a truck to take the full barrels to the processing factory where the resin is distilled into turpentine and rosin. These products enjoy a steady demand from industries worldwide. The entire process of collecting resin is done by individual *resineros* up until the point of sale to the factory. The best time of year for tapping resin is from January to May during the dry season. The heat, low humidity, and

Figure 2. Resin barrel collection point.

near absence of rain during this period give higher resin yields than the rest of the year (ADECAF, 1998.) There are seven species of pine in Honduras, and the two most common are ocote pine (*Pinus oocarpa* Schiede) and Carribean pine (*Pinus caribaea* Morelet var. *hondurensis* (Senecl) Barr. & Golf.). These two species are also the most commonly tapped pines for resin. In general, Carribean pine is found at lower elevations up to approximately 500 meters above sea level, and ocote pine is found in intermediate elevations of 500 to 1000 meters.

METHODS

The histories of five agroforestry cooperatives, which were among the first groups founded under the Social Forestry System, are the focus of this study. The methodology used in gathering data on each cooperative is instrumental comparative case studies (Stake, 1995). By comparing these cases, it is hoped that larger conclusions can be drawn about agroforestry cooperatives and the Social Forestry System in general. The data gathering for the case studies was conducted using direct observation, participant observation, focus groups, informal interviewing, unstructured interviewing, and semi-structured interviewing (Bernard, 2002). For each cooperative the researcher worked to obtain basic data as outlined in Appendix 1. Included in the outline are basic data about the community, and also data specifically about the cooperative and its history. Appendix 1 also served as an interview guide for unstructured and semi-structured interviews.

The initial stage of the investigation began while the author was a Peace Corps Volunteer assigned to the Cooperativa Agroforestal La Guadalupe Limitada in the Municipality of Yuscarán, Department of El Paraiso. In this period, the author was a participant observer and became familiar with the Guadalupe Cooperative, the members of the cooperative, the village of Laínez, and what life is like for poor rural Hondurans. At the same time, the author learned about forestry, forest industry, COHDEFOR, and the Social Forestry System in Honduras. In order to assess these areas, several auxiliary field trips were conducted outside Laínez to visit other forestry cooperatives, sawmills, COHDEFOR offices, and internationally-funded projects working with forestry

cooperatives. The observations and unstructured interviews gathered in this period gave the author the knowledge base for this study.

After serving as a volunteer for two years in Laínez, the author spent an additional year working in the capital city of Tegucigalpa with FEHCAFOR (Honduran Federation of Agroforestry Cooperatives). Data for the Guadalupe case study was complete when the author moved to the capital. The data for the other four case studies was gathered during field trips taken while working with FEHCAFOR. Total time spent in field work for these four cases was approximately 20 to 30 hrs per group. Contacts obtained through working with the federation were valuable sources of information on these cases.

The cooperatives included in the study were Cooperativa Agroforestal Guadalupe Limitada, Cooperativa Agroforestal Villa Santa Los Trozos Limitada, Cooperativa Agroforestal San José de Protección, Cooperativa Agroforestal Quebrada Honda, and Grupo Agroforestal Chagüite Grande. The Guadalupe and Villa Santa Cooperatives are located in the Department of El Paraiso in the southeastern sector of Honduras (Figure 2). The Guadalupe cooperative is within the Municipality of Yuscarán, and Villa Santa is within the Municipality of Danlí further east. The Protección, Quebrada Honda, and Chaguite Grande cooperatives are all located in the Municipality of Villa de San Antonio in the Department of Comayagua in the central region of the country (Figure 3). All five groups are set in landscapes that are physically very similar, yet each cooperative has a distinct history.

Figure 3. Map of Honduras and departments. *Source: United Nations Cartographic Department.*

The cooperatives selected had existed for more than 20 years, and they began as pine resin cooperatives, later diversifying into other activities while continuing to tap resin. The long tenure of the groups' existence means that they have been at least marginally successful, and they have also overcome periods of difficulties. These long histories tell much about the challenges a forest cooperative faces in order to exist over the long term. The experiences of each group in trying to integrate logging with resin tapping are interesting and important for a number of reasons. First, the integration of logging with resin tapping can potentially give more long-term benefits to communities than either activity by itself (Johnson, 1998). Numerous development projects aimed at strengthening forest cooperatives in Honduras have tried to integrate the two activities.

In addition, this integration is nearly essential for the long-term sustainability of resin tapping because a tree can only be tapped for a finite number of years. Without logging to encourage new regeneration of trees, cooperatives will eventually run out of trees to tap. So the experiences of these groups can point out the obstacles, advantages, and disadvantages cooperatives might face in their development.

The level of trust the author was able to develop with each cooperative varied. For example, in working with the Cooperativa Guadalupe, the author had a high level of trust with the cooperative members after living two years in the community and working closely with the cooperative. Direct observation and participant observation were instrumental in gathering data while working and living with the cooperative. Conversely, in the case of the other cooperatives, the author had less time to interact with cooperative members, and therefore had to rely on unstructured and semi-structured interviews with cooperative members, as well as several informants outside the cooperatives. The data was gathered during field trips of one to four days during which the author stayed in the communities. The author learned about the other cases through contacts made during the two years with Cooperativa Guadalupe and while working with FEHCAFOR. In the case of Villa Santa and Protección, the author met leaders from those cooperatives while a volunteer with Cooperativa Guadalupe and FEHCAFOR. Using the same contacts, the author was formally introduced to leaders from Chaguite Grande and Quebrada Honda. These primary contacts for each group were instrumental in selecting informants and gaining trust in the groups. Sometimes the contact person arranged time to accompany the author and give introductions to informants. In the case

of Chaguite Grande, the contact arranged a meeting which the author took advantage of to conduct a focus group discussion/interview.

The format for the semi-structured interviews varied, depending on the position and work experience of the informant, as well as the amount of information the author already had obtained on the cooperative in question. The author attempted to direct the interviews in order to fill in information from the interview guide for each group. The interviews were kept as informal as possible, and responses from the informant often determined the direction of the interview. Note taking by the interviewer was minimal, relying instead on tape recording so that each interview could be reviewed later. Before each interview, the interviewer first introduced himself and explained the reason for the interview. It was made clear that the informant did not have to answer all questions. The interviewer also explained the use of the tape recorder and made it clear that the recorder could be turned off at any time. For the groups where semi-structured interviews were utilized, eight to twelve interviews were conducted for each cooperative. In addition, data was obtained from direct observation and unstructured interviews.

The use of key informants (Bernard, 2002) by the author was very important when informants gave inconsistent or confusing information. Talking to the key informants usually clarified the situation. Another technique used for clarification was asking other informants about the unclear information to see if they could verify or refute the information in question. The process of clarifying suspect information was especially important for the cooperatives in Quebrada Honda and Chaguite Grande because these were the groups the author was least familiar with.

RESULTS AND DISCUSSION

This section will present data gathered about the five cooperatives during the study. The first part is a brief description of each cooperative, and the second part discusses the obstacles, advantages, and disadvantages facing the cooperatives, comparing and contrasting the five cooperatives in key areas identified during field investigation. The case studies will be used to draw conclusions and make recommendations for all cooperatives. Unless otherwise cited, all information in this section is from field interviews.

DESCRIPTIONS OF COOPERATIVES

Table 1 shows general data for each of the five cooperatives in the study. Figure 3 (page 17) shows the locations of each cooperative.

Table 1. General data for the five study cooperatives.

Cooperative Name	Year Founded	Number of Members	Forest Tenure	Hectares
Cooperativa Agroforestal Guadalupe Limitada	1974	140	National	3,000
Cooperativa Agroforestal Villa Santa Los Trozos	1974	250	National	10,000
Cooperativa Agroforesal San José de Protección Limitada	1974	34	Comunal	1,453
Cooperativa Agroforestal Quebrada Honda	1978	38	Comunal	1,202
Grupo Agroforestal Chagüite Grande	1974	31	Communal	1,142

Cooperativa Agroforestal Guadalupe Limitada

The Cooperativa Agroforestal Guadalupe Limitada is located in the Municipality of Yuscarán in the Department of El Paraiso. Yuscarán is located 70 km southeast of the capital city, Tegucigalpa. The cooperative was founded in 1974 when COHDEFOR technicians proposed an agroforestry cooperative for the inhabitants of four villages: Laínez, Los Tablones, El Zarzal, and Cordoncillo. With the exception of Los Tablones, all of these communities are over one hundred years old. Many of the original inhabitants were former workers for the numerous mines which operated in the Yuscarán region beginning in the eighteenth century. The cooperative was assigned approximately 3,000 hectares on national forest land. The forest was young secondary growth and some low-quality remnant pine trees (*Pinus oocarpa* Schiede) remaining from extensive logging done in the area during the 1950s and 1960s. During that period, there was a sawmill owned by a foreign company located in Los Tablones. The cooperative began with 30 members and currently has 140 members. The cooperative only tapped resin for most of its history, and it enjoyed stability and success. With this success, the group was able to contribute to projects in the communities and offer its members additional benefits. Between 2000 and 2003, the cooperative lost 35% of its forest area to pine bark beetle (*Dendroctonus frontinalis*) infestations.

Cooperativa Agroforestal Villa Santa Los Trozos

The Cooperativa Agroforestal Villa Santa Los Trozos is located in the Municipality of Danlí, which is also in the Department of El Paraiso. Danlí and Villa Santa are located in the far eastern portion of El Paraiso close to the border with

Nicaragua. Villa Santa is a young community; the first inhabitants arrived in the late 1940s from the southern region of Honduras. Villa Santa was a pioneer community established in an area that has since absorbed large numbers of migrants. There are several smaller villages in the vicinity of Villa Santa where members of the cooperative also live. The 10,000 hectare forest of the cooperative is national forest, even though many *resineros* have titles to their plots. The group was legally recognized in 1974 after the community organized to prevent a logging company from clear-cutting the mature pine forests around the community in 1973. The cooperative has about 250 members now, most of whom tap resin. The cooperative and resin tapping have been integral in the development of the community. The cooperative contributed to improving the road into the community, building the water system, building the community center, and building the elementary and high schools in the community.

The cooperative has expanded into other activities during its existence. Among these are the operation of a general store in the community, firewood collection, logging, and sawmill operation. Like the Guadalupe Cooperative, the forest of Villa Santa was damaged by the pine bark beetle breakouts that began in 2000. The losses due to the beetle were significantly higher for Villa Santa than for Cooperativa Guadalupe.

Cooperativa Agroforestal San José de Protección Limitada, Cooperativa Agroforestal Quebrada Honda, and Grupo Agroforestal Chaguite Grande

The cooperatives in San José de Protección, Quebrada Honda, and Chaguite Grande are all located in the Municipality of Villa de San Antonio in the Department of Comayagua. The three villages are situated approximately 90 km north of the capital city

and near the principal highway linking the capital with San Pedro Sula and the North Coast region of the country. The three groups are smaller than Villa Santa and Guadalupe because their membership is generally limited to residents of one village as opposed to several villages. The Cooperative of San José de Protección has 34 members, Quebrada Honda has 38, and Chaguite Grande has 31. Protección and Chaguite Grande founded their cooperatives in 1974, and Quebrada Honda was founded in 1978.

San José de Protección is the oldest of the three communities. It was founded in the 1860s as a stop along the old route between Tegucigalpa and the North Coast. Quebrada Honda was founded a few decades later, and Chaguite Grande was founded in 1940. The original inhabitants of Quebrada Honda and Chaguite Grande migrated from San José de Protección, so the three communities are closely linked by proximity and kinship. The cooperatives work on communal forest land instead of national forest. These communities received *títulos ejidales* (communal titles) to their land at the beginning of the twentieth century from presidential decrees granting them the land. As a result, these communities have never doubted the validity of their claim that the forest was theirs. Protección has an area of 1,453 hectares, Quebrada Honda has 1,202 ha, and Chaguite Grande has 1,142 ha.

All three groups have experience with management plans, logging, and firewood collection in addition to resin tapping. Quebrada Honda and Chaguite Grande have had extensive experience working with international development projects, while Protección has remained almost entirely independent of outside assistance.

OBSTACLES, ADVANTAGES, AND DISADVANTAGES

Forest Resource Base

Each cooperative in the study controls the forests where they work under supervision of AFE/COHDEFOR or the municipality. The differences between the forests have affected the groups in different ways. The higher-quality forests have a higher value in terms of forestry and products that can be harvested. In general, the forests can be ranked based upon size of trees present and site quality (soils, rainfall, slope), from best to worst: Villa Santa, San José de Protección, Chaguite Grande, Quebrada Honda, and Guadalupe. The forests of the Villa Santa and Guadalupe Cooperatives have been degraded significantly as a result of pine bark beetle (*Dendroctonus frontinalis*) infestations.

Because there has never been heavy logging in the area, the forest of Villa Santa was the least disturbed of the five cooperatives studied. The cooperative was originally founded to prevent foreign logging companies from cutting the area. There are large areas of mature forest, and the trees in those areas can average over 30 inches d.b.h. Cooperative members have counted over 250 growth rings on log specimens harvested from the forest. Actual age is probably less due to the tendency of trees growing in tropical climates to exhibit more than one growth ring per year. Until the arrival of the bark beetle, the cooperative was able to manage the forest for resin and timber production without significant degradation. At times, the high quality of the forest has been a disadvantage for the cooperative. The sheer quantity of mature timber has been a temptation for logging companies and even individual timber poachers. The cooperative members have had to defend the forest from intrusion collectively and individually since

they staked their claim to the forest. In one example, *resineros* repeatedly reported illegal firewood cutting in their plots until local authorities apprehended and fined the violators.

The forests belonging to the Cooperatives in Protección, Quebrada Honda, and Chaguite Grande are lower quality, especially in age and diameter, than the forest of Villa Santa due to lower rainfall and shallower, poorer soils. The smaller diameters of the trees on this site may also be a result of the greater human presence in the area for more than a century. Although the forests in these communities were not logged extensively, there was small-scale harvesting going on, if only by the community members for building materials. The forests have remained intact until recently because of the communities' ancestral ownership of the forest. Not only do the communities hold the titles to the forest, but they have defended it against attempts to exploit the forest or appropriate the land. Informants in Protección told about staging protests in front of the municipality when the mayor was attempting to sell a logging contract in their forest to an outside company. The forests of Chaguite Grande and Quebrada Honda hold lower volumes of timber than Protección due to over-harvesting that has occurred since 1998.

The Cooperativa Guadalupe manages the most disturbed and lowest-quality forest among the five cooperatives. The climate and soils of the Guadalupe forest are almost identical to the forests of Protección, Quebrada Honda, and Chaguite Grande, but almost all of Cooperativa Guadalupe's forests were heavily logged in the 1950s and 1960s. AFOCO foresters estimated most stands in the Guadalupe forest to be 30 years old or younger. The only older trees are the few remnant trees left over from the past logging. These remnants all contain some large defect such as forking, low height, curves, crooks, or very old wind or lightning damage. When the cooperative began tapping resin in the

1970s, there were few trees of appropriate size for tapping. Outside groups or individuals have not attempted to infringe on the cooperative's forest or harvest its trees; limited value has protected the young forest. The Guadalupe forest illustrates another important factor. After the heavy logging of the 1960s, the forest regenerated naturally without any outside interference. Most pine forests in the country are naturally regenerated, and reforestation by planting is not common on a large scale.

Land Tenure

The land tenure arrangements for the cooperatives studied fall into two categories: national and communal forest. The Guadalupe and Villa Santa Cooperatives are located in national forest and the other three are in communal forest. Land tenure can have profound effects on the success of any community forestry or conservation endeavor. Richards (1996) argued that by excluding *campesinos* from forest management, they learn that the only benefit to be gained from the forest is by clearing it and using the soil beneath. On the other hand, formal or informal forest tenure rights enjoyed by the study cooperatives have been incentives for these groups to manage and protect the forest instead of destroying it.

AFE/COHDEFOR is the agency charged with the management and protection of public forest lands in Honduras, but its ability to do so is limited. Among AFE/COHDEFOR's limitations are lack of credibility and lack of resources. The most common perception of the agency among Hondurans is that it is a corrupt, dishonest agency that follows the law only as far as it suits them. Coupled with this, the resources AFE/COHDEFOR has to work with are limited for the size of the job appointed to them.

They simply cannot control what happens in the forests at all times. For both *campesinos* and loggers, there is little risk in violating the law.

The Villa Santa and Guadalupe Cooperatives work on national forest land, which is administered by AFE/COHDEFOR. They must depend a great deal on AFE/COHDEFOR for support and approval for all their activities in the forest. Neither of these groups had secure tenure to their land when the cooperatives were founded, but over time they have strengthened their claims to these lands. When the residents of Villa Santa prevented a logging company from entering their forests, the community had no legal claim to the land. Through collective action and *de facto* possession they were able to gain user's rights over the forest. After forming the cooperative, they had no guarantee from COHDEFOR that the forest would never be harvested by or sold to outside groups, but the cooperative has defended its forest from loggers, cattle ranchers, and migrant farmers. Approaching Villa Santa northbound from the Jamastran Valley, the hills surrounding the Villa Santa forest are largely treeless and covered by cornfields, pasture, and isolated fragments of forest. The transition from these deforested hills to the forest managed by the cooperative is abrupt. Continuing north after passing through Villa Santa one observes another abrupt change when leaving the management area of the cooperative (Figure 4). The lands surrounding the Villa Santa forest were once national forest, but migrant farmers and ranchers cleared the forest to establish claims to the land by "improvements." Later they were able to obtain titles through the land titling program in the early 1990s. This pattern of clearing land to obtain legal tenure has also been observed in the buffer and nuclear zones of the Río Plátano Biosphere Reserve in the La Moskitia region of Honduras (Richards, 1996). It was fortunate that the cooperative

became established before the arrival of the land titling program, or the entire area may have been deforested.

Figure 4. Deforested area adjacent to Villa Santa Cooperative forest.

Oddly enough, the titling program did benefit the cooperative in some ways. Property rights in the community evolved to exist at two levels: the individual rights of *resineros* and other community members and the collective rights of the cooperative. Within the community, resin plots are recognized as private property, even though there was no legal basis for this when the cooperative began working. Plots are bought and sold within the cooperative. The size of plots varies, and plots are commonly inherited from family members. In 1992, the land titling program worked extensively in the Villa Santa area titling agricultural and forest plots. For resin plots, the *resineros* received usufruct titles. The titles formalized their claims to the forest land. Community members were granted full ownership rights to agricultural plots. On the collective front, the

cooperative signed a usufruct contract with AFE/COHDEFOR in 1998 in accordance with the Agricultural Modernization Law of 1992. The contract gave the cooperative exclusive harvesting rights in their forest.

The situation of the Cooperativa Guadalupe is somewhat different. They did not have to fight initially to be given rights to the forest. They were assigned a forest area where they could tap trees for resin after the cooperative formed. The cooperative and its members did not have any guarantee or contract for their forest, but there was never any threat to the cooperative's claim on the land due to the low quality of the forest it held. The same framework of locally-recognized ownership of resin plots was present within these communities as in Villa Santa.. The cooperative existed in relative tranquility until Project AFOCO arrived in the communities. With the addition of a management plan and logging, the project negotiated a 40-year usufruct contract between the cooperative and AFE/COHDEFOR. The contract solidified the cooperative's legal claim over the forest against future challenges even in the absences of such threats.

The communal tenure arrangement for the cooperatives in San José de Protección, Quebrada Honda, and Chaguite Grande is an interesting case. There are two titles for the forest land of the three groups. The forests of Protección and Quebrada Honda belong to the same title, which is called the Potrero Grande title. Chaguite Grande has its own title. These communities have held the titles to their forest for almost 100 years. In that time they have managed the forest for resin, timber, and firewood production while protecting it against encroachment and degradation by outside interests.

Informants from Protección related stories about defending their land titles from the various mayors from Villa de San Antonio. The titles are kept in the village of San

José de Protección, and one community member is the designated bearer of the titles who is responsible for protecting the documents. The bearer of the titles is changed periodically, but there is no set term that one person holds the titles. If the mayor or any other authority arrives at the village, the residents of Protección have developed a communication chain in response to these threats. Upon receiving warning of a threat, the titles are immediately taken to a safe location outside the community. The author interviewed one title bearer who remained in hiding for over a month, "They returned to the village every day, so I had to stay in my hiding place."

The antagonism between the villages and the municipality has only increased since the cooperatives began logging their forests. The Municipalities Law and the Agricultural Modernization Law both stipulate that the municipalities are the executors of communal land. This means that the cooperatives must work directly with the municipality to receive approval for management plans and harvesting. The municipality has the right to charge stumpage fees and taxes for extraction of resin, firewood, or timber. The cooperatives resent this perceived violation of their communal property. "The forest belongs to the communities, we have the titles. We shouldn't be forced to pay taxes to the mayor when we are the ones who have always taken care of the forest. The municipality has always wanted to steal our land to cut the trees." If the cooperatives do not pay the taxes, the municipality will not even give permission to tap resin, much less harvest timber. More hard feelings are generated by accusations of corruption in the municipality. One informant stated that their cooperative had paid over one million Lempiras (17.4 Lps. = $1) in taxes during the term of the last mayor. At the same time, both Quebrada Honda and Chaguite Grande were logging and paying taxes as

well. When the mayor was elected to the national congress, he left *ni un cinco* (not one nickel) in the municipal coffers.

In spite of the conflicts, the cooperatives have managed to continue working in the forest. The communities' strong hold on the forest has prevented corrupt city officials from potentially stripping the resource. One long-time COHDEFOR employee cited a cooperative he had helped train whose communal forest was logged by two mayors, leaving the cooperative with almost nothing.

Members from all five cooperatives have tapped resin in private forest. The proportion of *resineros* working on private land from each cooperative amounts to less than five percent of the land area under resin tapping (estimation based on estimates from cooperative members). The arrangements made for tapping resin on private land vary a great deal. Typically, the *resinero* pays the landowner a percentage of the income earned from tapping or a set price per barrel of resin extracted. These arrangements are normally not secure. The landowner may decide to sell the land or stop allowing tapping on the land. The *resinero* is then forced to find somewhere else to tap.

The most important thing that can be learned from the tenure arrangements of these cooperatives is that their initial access to the forest has made it possible for them to exist. Without secure forest access, cooperatives cannot exist in the long term. In San José de Protección, Quebrada Honda, and Chaguite Grande, their ancestral legal claim to the forest was a great advantage. The people in Villa Santa obtained their forest through organization and activism, and the Cooperativa Guadalupe was granted access to a forest which had little value for anyone else. The critical nature of land tenure for cooperatives was emphasized many times for the author while working with FEHCAFOR. He talked

to leaders of other cooperatives who were never able to work because access to the forest was never granted. The situation is especially critical in the Department of Olancho, which is the epicenter of commercial logging in Honduras. Groups wishing to operate on national forest land face an uphill battle to gain rights to forest coveted by powerful commercial loggers. In an area near Gualaco, Olancho, the author visited four cooperatives who had been waiting more than three years for permission to tap resin in the forests around their communities. "We go to the COHDEFOR office, and they tell us that they will come visit our community to show us where we can tap trees. Then they never show up. They only work for the loggers who pay them bribes."

The ability to defend tenure rights is also important, and these cooperatives have all had to defend against threats to their forests. The three cooperatives occupying communal land and holding their own titles would seem to have the most security, but they have fought serious threats to their land rights for many years. The group that appeared to have the least security, Cooperativa Guadalupe, encountered almost no challenges to their occupation of the forest for more than 20 years because of the low economic value of their forest. Villa Santa defended their forest against loggers and sawmills because of their organization and collective voice. The current threat to both Guadalupe and Villa Santa has been the disturbance caused by the pine bark beetle. Farmers are now invading dead patches of forest to plant crops and put up fences. With crops being planted where the forest once was, the regeneration of the forest is not certain. It may be possible for the squatters to gain legal title to the land after three years.

Structure and Functionality of Cooperatives

The structures and mechanisms a cooperative uses to function are important for the long-term survival of the cooperative. Cooperatives that are legally recognized by the Honduran Institute of Cooperatives (IHC) have the same basic structure. All cooperatives have a Board of Directors (*Junta Directiva*) consisting of a President, Vice-President, Secretary, and Treasurer. Some cooperatives have one or more *vocales* (representatives) on their board of directors as well. The Board of Directors are the leaders of the cooperative, and they handle the day-to-day operations of the cooperative in most cases. The other governing body of cooperatives is the Board of Trustees (*Junta de Vigilancia*) which monitors the way the cooperative and the Board of Directors operate. The Board of Trustees normally consists of a President, a Secretary, and two or three *vocales*. Both the Board of Directors and Board of Trustees are elected by the cooperative members. The IHC stipulates that cooperatives must have at least one general assembly each year where they hold elections and conduct other important business.

All cooperatives in the study follow this general pattern with little variation. Cooperativa Guadalupe, Villa Santa, and Chaguite Grande all hold general assemblies once per year. In past years, additional assemblies have been called due to special circumstances such as the resignation of a Board member or a problem which requires the input of the assembly. Protección and Quebrada Honda both hold monthly assemblies. They feel that the members are more informed and can participate more with the frequent assemblies. Informants from both Guadalupe and Villa Santa said that their members were too spread out to expect them to meet every month.

All of the Boards of Directors interviewed had a meeting every month. Members see service on the Board of Directors as a great responsibility and take it very seriously. One informant said, "We are responsible for the cooperative and its money. If we don't do our jobs, the cooperative suffers." Indeed, problematic members of the Board of Directors can have negative effects on a cooperative. At least one informant from each cooperative except Protección could remember instances where a member of the Board had embezzled money or acted dishonestly. Villa Santa elected an entirely new Board of Directors because of embezzlement. Some cooperative members, of course, are looked up to as leaders. These individuals are elected to Board positions repeatedly over the years, although not successively. One informant from Protección said that he had held each position on the Board of Directors at least twice. This seems common, especially in the smaller groups.

The Board of Trustees is widely neglected in the study cooperatives and in cooperatives nation wide. Only two cooperatives, Villa Santa and Protección, reported having active Boards of Trustees. Membership on the Board of Trustees has a lower status for cooperative members. An informant from Cooperativa Guadalupe said of the Board of Trustees, "Most of us don't really know exactly what the Board is supposed to do. Watch the Board of Director meetings? Someone said that we should verify the accounting and records, but not all Board members can read, and only two people in the cooperative know accounting." One ex-member of the Guadalupe Board of Trustees said, "I just didn't have time to go to meetings to do what? We don't even know what we are supposed to really do or if we can." These are statements heard repeatedly about Trustee Boards. In theory, they should serve a valuable function of ensuring

transparency in matters concerning the Board of Directors. Disfunctionality or non-functionality of Boards of Trustees has surely allowed unscrupulous cooperative leaders opportunities for wrong doing. A working Board of Trustees could potentially avert these problems before they become a threat to a cooperative.

When problems do happen, it is the leadership and collective participation of a cooperative that can overcome difficulties. Cooperativa Villa Santa survived a major crisis in 1985. They realized that the president had been embezzling substantial amounts of money from the cooperative's savings. New leaders took charge and were able to recover most of the money and restore members' confidence in the leadership. One informant from Villa Santa said of the incident, "The old leaders became greedy, and so we had to fix the problems in our cooperative and recover what we worked for."

The biggest observed weakness of cooperative functionality and leadership is education. Poor education in most of these communities has not equipped most cooperative members with the knowledge necessary to act as cooperative leaders. In 1994, 27% of the total population was illiterate, and the percentage was 84% in rural areas (Norsworthy and Barry, 1994). This means that a small percentage of cooperative members have the potential to effectively manage a cooperative, which is, in essence, a business. The percentage of members able to lead a cooperative is even less when one considers some of the additional skills and knowledge that are desirable for cooperative leaders. They must deal with COHDEFOR and municipality personnel and market the products of the cooperative. Marketing is particularly difficult for cooperatives expanding into the lumber market. Cooperative leaders are usually at a disadvantage in these situations. The physical and cultural isolation of their communities also has an

effect here. When Cooperativa Guadalupe began marketing sawn lumber, they spent over a year learning by trial and error how to deal with lumber buyers, which cost them tens of thousands of Lempiras. Some cooperative leaders do learn to manage and govern effectively, but these people are a tiny minority within cooperatives.

Benefits for Cooperative Members and Communities

Agroforestry cooperatives can provide multiple benefits to individual members and their families as well as the communities where the cooperatives work. By examining these different benefits, we can see some of the incentives communities may have to participate in the Social Forestry System while managing and protecting the forest. The benefits derived from forest management determine how much importance the cooperative and community members put in the success of the cooperative.

For cooperative members, the most important benefit from being a member is employment and income. The employment may be in resin tapping, logging, in sawmills, or working on fire crews. When asked about the importance of resin tapping to one informant, he replied, "Besides farming, tapping is the most important work I do. I plant crops to feed my family, but the land here is bad. I have little land, and it almost never produces extra to sell. Selling resin is the only way I can get cash to buy the things I can't grow."

Families living in rural communities located in pine forests typically are subsistence farmers. They grow crops on marginal soils and usually do not produce cash crops or extra basic grains for sale. Jobs, even low-paying laborer jobs, are scarce in these places. Families that do not work in forest management typically have few options

for cash income. They can work as day laborers for those who have more land or raise cash crops and cattle. Jobs planting crops as day laborers or *mozos* are abundant during the planting season, but scarce the rest of the year. Regular employment at a cattle ranch or large coffee *finca* is hard to find. The only other option is leaving the community to work in the cities where it is relatively easy to find a job in a *maquiladora*, or factory. Migration from rural areas to urban areas is a nationwide trend in Honduras, and it is easily observed in these communities. In Laínez, where the author spent two years as a Peace Corps Volunteer, a large percentage of youth leave the village to look for work or to go to high school. One friend of the author remarked, "I left because there was really nothing for me to do there. I miss living in the *campo*, but at least I have a job." The path of rural migrants usually ends living in extremely poor neighborhoods on the outskirts of the cities and working in a *maquiladora*.

Resin tapping and other forestry activities are often the only other option where there is a cooperative. Employment in forestry work like resin tapping appeals to *campesinos* for several reasons. First, of course, is the income. In places with few options, one more option is always good. Resin tapping in particular is an independent activity, which allows people to work for themselves. Most *campesinos* prefer this because it closely resembles farming in its independence. For other activities like logging, cooperative members like working for the cooperative better than working for a ranch or large farm because the cooperative belongs partially to them. In effect, they are working for themselves. Forestry work also fits into the agricultural calendar when there is no farm work. This is especially true for resin tapping, which is most productive during the dry season when there are no important crops. Logging operations typically

cease during planting time so the workers can plant their fields. All the cooperatives also said that surpluses, when available, are divided between the members in addition to whatever money they earn working. This is especially true for cases where a cooperative makes money in logging.

In addition to employment and cash income, members receive other benefits. All the cooperatives in the study reported giving credit to their members when sufficient funds were available in the cooperatives' savings. This is an important advantage for people who normally have no access to credit. In addition, the cooperatives reported giving emergency assistance to members in cases of illness or death. Cooperativa Guadalupe also has a Christmas savings fund, which members can contribute to from their income. The members then withdraw the money before the holidays, buying gifts or entertaining family. Many members, especially those who participate in cooperative leadership, also have the opportunity to gain new skills and experience.

The activities of the cooperatives also benefit the communities in a collective sense. All the cooperatives reported contributing to community projects and organizations in some way. Villa Santa, for example, has contributed money and labor towards projects in the community including roads, a community center, the water system, and the primary and secondary school. The cooperative also operates a general store where people can buy farm implements and other products at discount prices without leaving the community. Protección contributes three Lempiras per barrel of resin and fifty-five Lempiras per cubic meter of wood to the *Patronato* (Village Council). The *Patronato* uses the money for community projects. The cooperatives also manage and protect the forest and watersheds surrounding the communities.

These benefits make agroforestry cooperatives attractive to the communities that have them and to many communities that do not. So the question is, why are there not more agroforestry cooperatives working in rural communities in the forests of Honduras?

Institutional Support

All cooperatives must collaborate with AFE/COHDEFOR and the municipalities to obtain support for their forest management or harvesting activities. Unfortunately, Honduran government bureaucracies can be difficult to work with, and the experiences of these cooperatives reinforce that image.

Cooperativa Guadalupe and Villa Santa, which work in national forest, must deal with AFE/COHDEFOR extensively. The agency performs functions for the cooperatives such as approving management plans, operational plans, and usufruct contracts, charging stumpage fees, coordinating fire crews, assigning forest areas, and distributing invoices. Without the backing of AFE/COHDEFOR, a group cannot operate.

The national headquarters of AFE/COHDEFOR is in Tegucigalpa. The headquarters is divided into departments with different responsibilities. One of the departments is the Department of the Social Forestry System. The SFS Department works in promoting new agroforestry groups and supporting the groups that exist. Not all the groups the SFS works with are cooperatives. Small businesses, *patronatos*, and municipalities also work with the SFS. The country is divided into eleven AFE/COHDEFOR regions. Each region has a main office, and the regions are subdivided into 59 management units. The management units are directly responsible for

all forestry activities within their unit. Each regional office and some unit offices have SFS employees. Most unit offices are quite small and only have two or three employees.

Some of the weaknesses of AFE/COHDEFOR as an organization have already been mentioned; they lack financial resources, material resources, and human resources. Their scope of responsibility is broad, and the resources they have are not sufficient for the job. These limitations are exacerbated by AFE/COHDEFOR's reputation for corruption and incompetence (Richards, 1996). Among agroforestry cooperatives, people believe that AFE/COHDEFOR employees only cater to loggers or people with money. Informants in Protección complained that their management plan had been awaiting approval for three months, while loggers and sawmill owners received next-day service. "They make things difficult for us. We travel all the way to the unit office, and they tell us to come back the next day. They never make the loggers wait." Cooperatives feel that they are subject to greater scrutiny from AFE/COHDEFOR than the loggers as well. The President of Cooperativa Guadalupe mentioned AFE/COHDEFOR policy regarding invoices and harvests as an example. "When a harvest has more wood than the plan said, we always report to COHDEFOR even if it's only two cubic meters. Then we get charged extra. [Emilio] (truck driver) has worked with lots of loggers. He says they never report those things, and they even take extra on purpose."

AFE/COHDEFOR's treatment of the cooperatives is a source of frustration, especially when they know that the rules are not the same for everyone. They also know that following the rules puts them at a disadvantage because of the added costs of operating within the law. An informant from Villa Santa said, "We follow the law and it costs money. Then all the illegal loggers just go to the forest, cut down the trees and sell

them. It doesn't cost them anything except a little to bribe COHDEFOR or the police. Then they can sell the wood at a lower price, and that hurts us." The task of jumping through hoops for AFE/COHDEFOR is a burden on cooperative leaders, who often become frustrated by the bureaucratic process. The financial burden of wasted time and red tape is a disincentive for working within the law.

AFE/COHDEFOR's capacity to serve all forestry sectors was further reduced in 2003 when government budget cuts forced it to lay off half of its employees. The insufficient human resources from the past have been cut in half, and the difficulty of getting support from AFE/COHDEFOR has multiplied.

Dealing with municipalities can be another obstacle to the cooperatives. The groups that work in the Municipality of Villa de San Antonio must work closely with the Municipality. In spite of the conflicts about forest ownership over the years, these cooperatives must pay stumpage fees to the Municipality and obtain approval for plans and permission to harvest wood and resin with them as well. The Municipality of Villa San Antonio charges the cooperatives the same stumpage fees that AFE/COHDEFOR charges on surrounding national forest. In the end, AFE/COHDEFOR still has to approve all plans, and they also charge a small tax. These cooperatives feel it is unjust for the Municipality to charge such a large stumpage on land that belongs to the cooperative to begin with. The Municipality does not provide services to the communities for the fees they charge. "They don't help us with anything. They just hold out their hand. When we built our water project, the Municipality didn't contribute."

Cooperativa Guadalupe has had some problems with the Municipality in Yuscarán since the new mayor was elected in 2002. The cooperative always paid a small

fee to the Municipality for every barrel of resin they took from the forest, but they did not negotiate any taxes with the Municipality for logging. They were told by AFE/COHDEFOR it was not necessary because they work on national forest. The mayor sent notice to the cooperative that they would have to pay the Municipality 100 Lps. per cubic meter of wood they harvested. His justification was the Municipalities Law, which states that Municipal governments have the authority to manage natural resources within the Municipality. As with Villa de San Antonio, he was not offering services to the community, he only wanted to charge money. The Municipalities Law contradicts the Agriculture Modernization Law. Contradiction is a common problem in the Honduran legal system. In this case, the Municipalities Law gives power to municipal governments to manage natural resources, while the Agriculture Modernization Law says that AFE/COHDEFOR is the executor of all national forest land. After several meetings, they negotiated a much smaller tax for the municipality because they were not offering support for the cooperative or community. The cooperative still had to pay the Municipality.

Cooperatives do not trust AFE/COHDEFOR and the municipalities to treat them fairly. Experience has taught them what to expect from these institutions, and they act accordingly. The atmosphere of distrust prevents both the cooperatives and the institutions from doing their jobs well.

International Aid Projects

During the 1990s, many international aid projects began working with Honduran Social Forestry System groups. The experiences of the study cooperatives show some of the advantages and disadvantages of project assistance for cooperatives.

Cooperativa Guadalupe operated without external interference or assistance until 1995 when a German-funded development project called AFOCO (Supporting Community Forestry) arrived to work in the area near Yuscarán. AFOCO worked with the cooperative as well as other groups within the communities on project areas such as forestry, agriculture, infrastructure, and organization. The project negotiated a usufruct contract with AFE/COHDEFOR for the cooperative forest and developed a management plan which included logging, resin tapping, reforestation, and fire protection. The plan was first implemented in 1998. Beginning in 1999, AFOCO financed the construction of a sawmill so that the cooperative could add value to the logs and generate more jobs in the community. The cooperative now owns a truck, which they use in the logging operation. The project ended in 2002 and the cooperative has been experiencing difficulty obtaining permission to harvest from AFE/COHDEFOR. The sawmill and logging operations are inactive, and the cooperative may have to sell a property it owns in Yuscarán in order to pay the debt incurred through construction of the sawmill.

The overall capacity of the cooperative and its leadership has grown with the help of AFOCO. Many members have received training in basic management and accounting. The cooperative has expanded into logging and sawmill lumber production in the years since the management plan has been in effect. When the cooperative first began to work with the management plan, project personnel handled most of the administration and

management. When the project ended in 2002, cooperative members were handling all of these functions. In addition, the cooperative now has capable managers who know how to manage the sawmill and sell the lumber it produces. The usufruct contract guarantees secure forest tenure for the cooperative. The cooperative also pays for and organizes a fire crew each dry season to put out fires and manage controlled burns.

However, there is a sense that AFOCO tried to do too much too fast. The transition from a cooperative of *resineros* to a diversified group working in resin tapping, logging, and lumber conversion is a drastic one. The time frame for implementing these changes was short, and good planning and execution suffered as a result. Many members of the cooperative were overwhelmed and bitter about the changes made. The *resineros* were the ones who felt most affected by the changes. They never had a clear understanding of the management plan and the harvesting system because they were never explained to them, even though they were most affected by these changes. One *resinero* recalled how a cut was done in his plot without warning or explanation.

> "One day I was emptying cups, and I saw that there were blue and white paint spots on the trees. I didn't know why someone painted the trees. Eight month later, some *compañeros* (friends) from the cooperative showed up with chain saws and started cutting down my trees. They said it was for the management plan, and the technicians from AFOCO said that they needed to cut some of the trees so others could grow better. But, I lost many trees from my plot that could still be tapped. They told me I couldn't tap the trees with white paint, either. The same thing is happening to other *resineros*. There are more *resineros* in the cooperative than those working in logging. How can they just take our trees?"

The sawmill was the best example of poor planning and an overly optimistic timetable. Because no one in the project had experience with sawmills, they did not

know what was important for planning the project. The layout of the mill was poorly designed, which later hindered production efficiency. The training for the members who would later work at the mill was insufficient. Once they started working, they haphazardly dealt with the numerous problems as they arose. The cooperative received no training in lumber drying and storage, sawmill maintenance and repairs, safety, sawyer techniques, and most importantly, marketing of the lumber. As a result, the cooperative had to learn by trial and error. While this is an effective learning technique, it was risky and it cost the cooperative and the project time and money.

Other factors like the pine bark beetle and the AFE/COHDEFOR downsizing have hindered the progress of the cooperative's new ventures. The current situation of the cooperative is precarious, which is unfortunate because the cooperative may have to sell its property in Yuscarán in order to avoid forfeiting the property to the bank.

Quebrada Honda and Chaguite Grande both worked with development projects in the past. Chaguite Grande was assisted by SIFE, an FAO project, from 1986 to 1990. The project trained the cooperative members in logging and lumber processing and also constructed a steam-powered sawmill in the community to process harvested logs. The sawmill only operated when the cooperative could obtain temporary permission to harvest. After SIFE left the community, the mill only worked until the first time it needed repairs. The sawmill is now a skeleton on the outskirts of the village.

In 1990, MAFOR, a project financed by the government of Finland, arrived to work with the communities of San José de Protección, Quebrada Honda, and Chaguite Grande. Protección decided not to work with MAFOR, but Quebrada Honda and Chaguite Grande accepted the assistance. In reality, the cooperatives from these

communities were not initially involved with the project. The project developed management plans and promoted independent small businesses within the communities to harvest the forest according to the management plan. The only part of the plan that included the cooperatives was resin tapping. Many of the logging group members were members of the cooperatives who left resin tapping to work with the logging groups. The groups only operated for two years until COHDEFOR revoked their permission to harvest due to violations of their contracts and the management plans.

MAFOR offered to renew harvesting, but to work with the cooperatives this time. Both the cooperative members and the community as a whole in Chaguite Grande opposed the proposal to continue logging. The cooperative declined MAFOR's offer, and now most of the cooperative members have returned to tapping resin. One informant said of the experience, "Bad things happened, and now some people are ashamed. That's why we are tapping resin again."

The Quebrada Honda Cooperative accepted the offer to continue logging. Some community members objected to renewed logging because many of the cooperative members were involved in the logging groups. Because of this, many believed that the cooperative would commit the same violations the logging groups had. One resident of Quebrada Honda said, "The same *pícaros* (sinners) who worked in the logging groups are all in the cooperative. They are going to do the same thing again."

The cooperative was given permission to log again, but only under the supervision of a special committee called the *Fondo de Manejo Forestal* (Forest Management Fund). The *Fondo* was composed of community members, many of whom were not members of the cooperative. Their job was to monitor the cooperative and

charge a small tax, which could later be reinvested in forest management activities including reforestation and fire protection. The cooperative worked and co-existed with the *Fondo* for about six months, then members of the cooperative began to interfere with the committee. This interference violated the contract agreed to and signed by the cooperative, the *Fondo*, AFE/COHDEFOR, MAFOR, and the Municipality. This further divided the community over whether the cooperative was trustworthy. At least one resident did not think it was. "The *Fondo* was doing its job. Why did the cooperative interfere? It's obvious that they are greedy to cut the forest for their own profit. The whole community should benefit if they are cutting." At last notice, the cooperative was inactive and waiting for meetings with the Municipality, COHDEFOR, and MAFOR to decide what would be done.

Protección, unlike its two neighbor cooperatives, has never received extensive assistance from a development project. MAFOR originally offered to work with Protección, as well as Quebrada Honda and Chaguite Grande. The cooperative in San José de Protección resisted the temptation to commit to MAFOR, which was offering money and sweeping changes. The cooperative decided as a group that the project was not in their best interests. One informant stated, "They wanted to log the forest with independent groups, and we didn't like the idea of giving responsibility for our forest to anyone other than the cooperative." Of all the cooperatives in this study, Protección is the best example of a cooperative that has survived with little outside assistance.

The advantages and disadvantages of development assistance for cooperatives is difficult to analyze because of different philosophies utilized in development projects. AFOCO and MAFOR were similar, but the results were very different. The result of

MAFOR's presence in Quebrada Honda and Chaguite Grande were generally negative. The conflicts within the communities were the most damaging aspect. The future of these two cooperatives is more uncertain because of their experience with the project. AFOCO's results are more ambiguous. The cooperative has much greater capacity since working with the project, but they were left vulnerable to the bank and AFE/COHDEFOR. New conflicts within the cooperative also arose because of the diversification of their activities. Only time will tell if they will be better or worse off because of the assistance of AFOCO.

Pine Bark Beetle

Beginning in 2000, Honduras experienced an outbreak of southern pine bark beetle (*Dendroctonus frontinalis*) that first entered the country from the southeast border with Nicaragua near the Municipality of Trojes, El Paraiso. The first outbreak of *gorgojo* (the Honduran name for the beetle) occurred in the 1960s and killed over half the pine forests in the country. Most damage from the first outbreak occurred in the Departments of Olancho and Yoro, but the Department of El Paraiso has been hit hardest this time. Both Villa Santa and Guadalupe sustained heavy losses from the *gorgojo*. Villa Santa lost over 80% of its forest area, and Cooperativa Guadalupe lost approximately 40%. Both cooperatives tried to control the spread of the *gorgojo* by cutting containment belts around the infestations, but the infestations were too numerous to control all of them and many jumped the containment belts cut by the cooperatives. The difficulty in containing the outbreaks on cooperative forests was exacerbated by surrounding forests where no sustained effort was made at containment. AFE/COHDEFOR made an effort to assist the

cooperatives and other communities with containment, but it was too little and too late. Fortunately, in Protección, Quebrada Honda, and Chaguite Grande pine beetle outbreaks were less severe. Now the *gorgojo* has migrated to the western half of Honduras where it continues to be a problem, albeit on a smaller scale than in the eastern half of the country.

Since the passing of the gorgojo in Villa Santa and Guadalupe, farmers are invading the deforested areas and planting crops or grasses for cattle. This could potentially convert large previously-forested areas to agricultural land. In the Guadalupe forest, the problem has been especially severe near the main road entering the community where dozens of new corn and bean fields have appeared where forests once stood (Figure 5).

Figure 5 Crops planted on area deforested by pine bark beetle.

Obviously, the loss of forest has affected both resin and timber production. When asked what the *resineros* were doing when *gorgojo* entered their plots, an ex-president of

Cooperativa Villa Santa said, "They just cry because they've already lost their forest once the *gorgojo* enters." The full impact these losses will have on the cooperatives and the communities is still unknown.

Resin Tapping

Although its importance has diminished due to diversification within the study cooperatives, resin tapping is still their most important activity. Silvicultural practices, reduced profitability, weak markets, and more than two decades of continuous tapping threaten resin tapping as a viable activity for the cooperatives. Solutions and possible alternatives are necessary for the continued survival of the *resineros* and their families.

Declining stocks of trees that can be tapped for resin are a threat to the sustainability of resin tapping for the cooperatives. They are simply running out of trees to tap (Figure 6). These groups have been tapping resin continually for over 20 years without any significant logging or disturbance to promote new regeneration. Logging is a recent addition for the cooperatives, and so the forests are full of trees that have been tapped on two, three, or even four faces (Figure 7). Logging also affects the number of trees available to the *resineros*. AFE/COHDEFOR will only approve management plans which specify the "approved" silvicultural method being used by AFE/COHDEFOR at that time. Whatever the method, the focus of approved management plans is timber production, while resin tapping and its potential profits are not taken into account. As a result, trees being tapped by *resineros* and trees with future resin production potential are often harvested.

Figure 6 This forest does not have many more useful years for resin tapping. Many *resineros* know that their days are numbered. One *resinero* in Protección

said of his resin plot, "I have only two or three years left that I can tap in my plot. All the trees are worn out. I have to carry a ladder with me so I can reach high enough to score the tree." The use of ladders and wood poles propped against trees (Figure 8) to reach higher on the resin face is a common practice. Figure 8 shows a resin face that is over twelve feet high.

Figure 7 Tree tapped on two faces.

Figure 8 Propped branches are climbed to reach higher on the face.

Low prices paid to the *resineros* for their product since the formation of the Fondo de Resina have adversely affected *resineros'* incomes. Some *resineros* are beginning to believe that tapping is not a worthwhile activity. Many groups, including FEHCAFOR and some aid projects, have negotiated with the Fondo to increase prices paid to the *resineros*. Table 1 shows the revenue and costs per 60-gallon barrel of resin for Cooperativa Guadalupe in 2002. The sale price at the factory was 900 Lempiras (17.4 Lps./Dollar) and the total costs were 232 Lps., not including labor. This leaves a net profit of 668 Lps. per barrel produced. Labor costs were not calculated because they vary considerably between *resineros* who tap their own plots and those who pay *mozos* to tap their plots. A study by FINACOOP (1995, as cited in Johnson, 1998) estimated the labor

required to produce one barrel of resin to be six man-days. Dividing the net profit per barrel of resin by six man-days of labor gives a return of 111.2 Lps. per man-day of labor.

Table 2. Revenues and costs per barrel of resin, Cooperativa Guadalupe, 2002.

Total Revenues Lps.[i]/barrel		
Sale price per barrel		900.00
Costs Lps./barrel		
Transportation	55.00	
Administration fee to cooperative	50.00	
Contribution to FEHCAFOR	12.00	
Municipal tax	9.00	
Management fee to COHDEFOR	35.00	
Materials and equipment[ii]	21.00	
Christmas savings (optional)	50.00	
Total Costs[iii] Lps./barrel	232.00	
Net Returns Lps./barrel		668.00

[i] Lempiras (17.4 Lps. = $1 in 2002)
[ii] Source, R.N. Johnson, 1998. Adjusted for inflation
[iii] Does not include labor costs.

However, the yield of resin per unit of labor input depends on many things such as the size of the plot, time of year, altitude of plot, slope and aspect of plot, size and age of trees in plot, and the spacing and arrangement of trees in the plot. In resin tapping, six man-days of labor implies completing the tapping cycle twice (Table 2). Each cycle consists of two man-days to score the trees, with two interval days to let the resin run. The cups are typically emptied every seven days. The interval time varies depending on the *resinero's* schedule and how fast the cups fill. For most *resineros*, the labor inputs are relatively constant, while yields vary substantially. The number of trees being tapped in the plot causes great variation in yield per unit of labor. Plots of less than 600 trees will produce less than one barrel from six man-days, while larger plots (>1000 trees)

produce more. Plots larger than 1500 trees produce more resin, but they usually require more than one worker. In this case, the labor costs increase per unit of resin production. A more detailed study is required to better understand the variables affecting resin production and profitability

Table 3. Resin tapping cycle and labor requirements.

Score trees (1 man-day)	Interval (no labor)	Interval (no labor)	Score trees (1 man-day)	Interval (no labor)	Interval (no labor)	Empty cups (1 man-day)
Score trees (1 man-day)	Interval (no labor)	Interval (no labor)	Score trees (1 man-day)	Interval (no labor)	Interval (no labor)	Empty cups (1 man-day)

Most *resineros* interviewed reported producing one barrel of resin per month. According to Table 2, that means that the average cash income for these families in 2002 was 668 Lps. ($38.39) per month for six months of the year. Regardless of labor inputs, this is not a large income for a family. In addition, *resineros* working in older worn-out plots report working the entire month, or approximately eighteen man-days, to produce one barrel of resin. This yield per unit of labor input is half that obtained by using FINACOOP's calculation of six man-days per barrel of resin production. Poor plot characteristics for resin production or degraded state of trees in the plots may cause lower yield than the FINACOOP calculated value for Cooperativa Villa Santa.

Various groups have worked to increase the prices paid to the *resineros* for their product. FEHCAFOR has always been the primary player negotiating with the Fondo de Resina for better prices. In the early 1990's, they experimented with exporting resin to Guatemala to create competition for the Fondo de Resina. The loss of raw material

supply obligated the Fondo to raise prices. FEHCAFOR exported resin for less than a year before internal conflicts caused them to stop. In 1999, EMCAH, the company owned by agroforestry cooperatives, again exported resin from its member cooperatives to INQUIOSA, a company in Guatemala. Between 1999 and 2001, they exported 2910 barrels of resin to Guatemala, which forced the Fondo de Resina to increase prices. EMCAH stopped exporting because of a conflict over prices with INQUIOSA. The Fondo de Resina lowered it prices again. FEHCAFOR has been trying to negotiate higher prices since 2001.

Dwindling tree stocks and conflicts over pricing have made the future of resin tapping more uncertain for these groups. Many *resineros* will have to find alternative employment as the availability of resin plots decreases. Crises like the *gorgojo* infestations have exacerbated the problem for the Cooperativa Guadalupe and Villa Santa. A period of change and adjustment may be approaching for these cooperatives.

Logging

All the cooperatives in the study have expanded their activities to include logging. Logging has the potential to provide a strong complement to resin tapping for these groups. It will also have important ramifications for the long-term success of the cooperatives. The introduction of logging in these cooperatives has been a drastic change, and many challenges have arisen. How the cooperatives adjust to the changes will shape the future of these groups.

In 1980, Villa Santa was the first group to obtain permission to log. In that period, COHDEFOR granted short-term *ventas locales* (local sales) to the group. The

cooperative worked sporadically with local sales during the 1980s and early 1990s. After the Agriculture Modernization Law passed, all cooperatives were required to have an AFE/COHDEFOR-approved management plan and operational plan to harvest timber. Villa Santa began working on their first management plan in 1994 and finished the plan in 1995 with some late assistance from ADECAF, an FAO/Netherlands project. The plan specified an annual harvest of over 9000 cubic meters, but by law, the cooperative could only harvest 1000 cubic meters per year without competing in open auctions for harvesting contracts. The Villa Santa forest contains large areas of over-mature forest, and the annual harvest limit perpetuated this condition. According to Villa Santa leaders, the limits are unfair. "The annual harvest limits on the cooperatives are unfair because it is the same for all groups. Our cooperative is large, and our forest is large. Is it fair that a cooperative with 20 members and 1000 hectares harvests the same as a cooperative with 250 members and 10,000 hectares? How can we manage our forest with these limits?"

The operational plans written for Villa Santa have never been carried out completely because they specify harvests that exceed the limit imposed on the cooperative. This increases the harvesting costs because the price paid for operational plans is based on the volume to be harvested. The cooperative uses a bulldozer for skidding the logs. It was being repaired when the author last visited Villa Santa, and cooperative members were negative about the benefits of using the bulldozer. "That thing just eats money. Lots of gas, plus it breaks down every couple of months. It spends more time here being fixed than out in the forest." High production costs for timber are the result of down time and non-completion of operational plans.

Cooperativa Guadalupe began logging in 1998 after AFOCO developed management and operational plans for the cooperative. In their first year, they did not harvest the 1000 cubic meters specified in the operational plan, but AFE/COHDEFOR allowed them to transfer the volume to the following year. In fact, the cooperative was still not harvesting the current year's operational plan in 2002 due to numerous work stoppages. Work stoppages were the result of equipment repairs, bad weather, waiting for AFE/COHDEFOR, and insufficient funds to pay fees or taxes. The efficiency of the logging operation has improved markedly in the years since they first started. All earnings from logging went to pay loans incurred in building a sawmill and buying a truck for hauling logs and lumber. From 2000 to 2002, the cooperative harvested large quantities of wood from containment belts utilized to control *gorgojo* outbreaks. Some deforested areas are being planted with seedlings, and others are being managed for natural regeneration. The management and operational plans had to be totally rewritten after the *gorgojo* losses. The logging operation of the cooperative is now inactive, awaiting permission from AFE/COHDEFOR to operate.

Protección obtained its first management and operational plans in 1995. The plans were paid for using a loan obtained from FEHCAFOR. They harvested 6600 cubic meters between 1995 and 2000. No one could explain how the group was able to get permission to harvest more than the 1000 cubic meter annual harvest limit. The management plan specified a selective harvest system which removed mostly older trees past their productive peak. The cooperative was satisfied with the results of the first management plan except for the low prices paid to them by the local sawmill. "COHDEFOR told us we had to sell to the mill in Flores. We signed a contract with

them the first year of the plan. They paid us low prices, and we couldn't break the contract." In spite of this problem, the cooperative did profit from the logging operation.

They paid for a new management plan in 2002 using money saved from the previous logging. The plan was awaiting approval when the author last visited the community. The new plan specified a system of thinning which removes trees of all diameter classes rather than the most mature trees. *Resineros* in the cooperative were apprehensive about the new plan because of the loss of current and future resin-producing trees. "My plot is very old already. There are trees marked for harvest that I could tap in a few years." AFE/COHDEFOR was not willing to allow changes in the management plan to accommodate the *resineros*.

Chaguite Grande harvested timber sporadically in the late 1980s and through the 1990s using local sales through COHDEFOR. They initially received training in logging techniques from SIFE. Quebrada Honda also harvested infrequently in that time period. The cooperatives were not invited to participate in the logging activities contained in the MAFOR management plan, which went into effect in 1998. The logging groups that implemented the harvesting from the management plan had to pay a 210,000 Lp. bond between the four groups as a guarantee of compliance with the management plan. All other resources were provided by the project. MAFOR used the model of small logging groups based on earlier experiences in municipalities where no cooperatives existed. After the groups lost their permission to harvest, they forfeited the 210,000 Lp. bond to the local sawmill owner, who had initially lent them the money.

The attempts at repairing the damages caused by the logging groups did not appear to work. At the end of 2002, the Chaguite Grande Cooperative was tapping resin

as before, and Quebrada Honda was awaiting meetings to see if they would be allowed to operate again.

The complexity and risks of logging are much greater than those of resin tapping. It also requires a larger initial investment. Therefore, difficulties are expected during the transition period. The study cooperative experiences show potential pitfalls that groups may encounter when initiating logging and management plan activities. Of the study cooperatives, Protección had the most positive experience. Their approach differed from that of the other groups. First, the group made the decision to log by themselves. The entire cooperative was involved in the process, and they decided how and when they would do it. They also used their own resources, which means they had a larger stake in the results. The cooperatives that worked with AFOCO and MAFOR did not have control over the logging projects. They operated using the model presented by the projects, instead of developing their own ideas. They also relied almost entirely on resources from the projects. Protección had problems, but they were free to deal with these problems and learn from them. The other salient factor of their experience was simplicity. For their first management plan, they only sold logs to a sawmill. They did not buy any large machinery which could break down. Villa Santa's experience resembled Protección's, except Villa Santa used higher technology. Villa Santa purchased a bulldozer to skid logs while Protección used oxen (Figure 9). Protección was also able to harvest their entire quota. Simplicity, flexibility, and independence were key factors for Protección's success relative to the other groups.

Figure 9. Landing area and oxen teams used for skidding logs.

Processing and Marketing of Timber

An additional difficulty encountered by cooperatives when expanding into logging is marketing a new product. The resin market in Honduras is characterized by almost no choices. The timber market, on the other hand, is extraordinarily complex. There are dozens of options to choose from when selling logs or lumber, and good decisions can determine whether the venture will make or lose money. Furthermore, all but two of the study cooperatives have experience in processing their own lumber. Owning a sawmill and processing logs the cooperative produces can be effective in adding more value to the product and producing more employment in the communities, thus maximizing benefits obtained from logging. The costs of the additional benefits are increased risk and initial investment. A sawmill is a large investment, and it adds new layers of potential problems.

For cooperatives that do not have their own mill, logs are sold to sawmills to be converted into lumber. All of the study cooperatives have this experience in common. The cooperatives from Quebrada Honda, Chaguite Grande, and Protección had similar problems. They all made commitments to sell to one mill. Protección was convinced to sign a contract, and afterwards they could not sell to buyers offering better prices. Chaguite Grande and Quebrada Honda used credit with the sawmill as a guarantee for COHDEFOR, which obligated them to sell to that mill. Villa Santa and Guadalupe were free to sell to the highest bidder.

The question of whether a sawmill is worth the risk for a cooperative is difficult. Mistakes can be painful and expensive. The mill built in Chaguite Grande was imported from Brazil and paid for by FAO. It was steam-powered and used wood scraps for fuel. It functioned well, but the cooperative was not able to supply the mill with logs on a consistent basis because of the sporadic nature of their harvesting contracts. Nor was great importance placed on obtaining material to process at the mill. This may be because the cooperative had not invested anything in it. One cooperative member said, "We never used it unless COHDEFOR gave us a *venta* and told us to start working. They usually did that when they were going to bring someone important to see our great project working. They would say, 'See how nice the *campesinos* are working.' They only gave us a *venta* if they were going to bring someone up. After that, nothing." The boiler of the sawmill eventually needed a major repair, but no one knew where to find replacement parts. That was the end of the sawmill. All useful parts were stripped and sold, and now the mill is just a roof with some rusty remnants under it.

Villa Santa bought an inexpensive circular sawmill powered by a gasoline motor. The cooperative members easily learned how to maintain the mill and the motor. The blade could be sharpened by hand, and the parts for the motor were readily available. The initial investment was repaid quickly, but the mill now sits idle most of the time because of problems in other areas of the logging operation, usually the skidder or coordination with AFE/COHDEFOR. Cooperativa Guadalupe's sawmill (Figure 10) was more expensive, with better equipment and a large diesel motor. Maintenance and repairs were also simple, but parts for the motor were more difficult to find. Over the

Figure 10. New sawmill at Cooperativa Guadalupe on its inauguration day.

first two years of operation, the mill averaged one to two days of down time for every six working days. The causes of down times were diverse, with no particular area of the logging operation a persistent culprit. Transportation, machinery failure, bureaucracy,

weather, and the planting season were all causes. Yield and production were poor the first year because of inexperience.

The biggest risk is the initial investment required to start a sawmill. Any long work stoppage can deprive a cooperative of the income it needs to pay loans incurred in building a mill. Cooperativa Guadalupe has experienced this problem. Their sawmill was quite expensive, and they purchased a truck while still paying their loan for the sawmill. The mill has been idle for half of 2003, and the loan remains unpaid.

Cooperativa Guadalupe also had problems selling its lumber, which were due to inexperience with business practices. The cooperative sent lumber to one client for over three months without receiving any payment. By the time they stopped delivering lumber, the client had accumulated a debt of over 150,000 Lps. and claimed he had no money to pay the cooperative. They managed to recover about half the debt, but the business went bankrupt and never paid the balance. It was a 70,000 Lp. mistake that may have been avoided had the group leaders known more about business practices.

Project ADECAF supplied the capital to constitute EMCAH, the marketing company created to cater to the agroforestry cooperatives. EMCAH was created to give cooperatives an advantage in the areas where they were weakest, marketing and lumber processing. Cooperatives paid 30,000 Lps. to become members plus 500 Lps. per year. Cooperativa Guadalupe, Villa Santa, and Protección are members of ADECAF. When ADECAF ended, ownership and control of the company passed to the member cooperatives. EMCAH uses a professional manager and sales representative to manage the company and market the products. EMCAH owns and operates three portable sawmills, which can be operated with any member cooperative harvesting logs. The

company absorbed the risk of owning the mills and supplied the expertise in operating the them and marketing the lumber.

Wood harvesting done in attempts to control the *gorgojo* outbreaks nationwide created a glut on the lumber market in Honduras during 2001 and 2002, which made all marketing difficult for EMCAH and the cooperatives. The difficult times forced some large sawmills out of business during that period. Merely surviving until conditions improve is an accomplishment. Market conditions have improved in 2003, but the weakness of AFE/COHDEFOR shifted difficulties to the bureaucratic end of production.

The long list of potential problems for cooperatives involved in harvesting, processing, or marketing lumber limits the number of groups that can realistically participate in these activities. These activities emphasize the importance of business skills and knowledge. Those groups able to survive the learning period may have a better chance of greater success in the future.

Integration of Resin Tapping and Logging

Introducing and incorporating logging within cooperatives that have existed for two decades tapping resin has been a shock. The ability to manage this transition smoothly is important for established cooperatives like those in the study because they cannot afford to remain static. Judging from conversations with *resineros*, resin tapping alone is not sustainable without logging to remove tapped-out trees and allow room for new trees that can be tapped. It may be possible for logging to exist without resin tapping, but that is probably not the ideal situation. The equal implementation of both activities together benefits more people at one time in the same forest.

The best model for resin/timber integration encountered in the study was Protección. The implementation of the 1995 management plan was a success because it did not harm stands used by the *resineros.* The integration succeeded because the entire cooperative was involved in the decision to start logging. People are less likely to complain if they have the opportunity to voice their opinion and if they understand what is happening. That was the reality in Protección. Unfortunately, the new (2002) management plan did not follow the same system used in the previous plan. The new system was a mandate from AFE/COHDEFOR, and it specified the harvest of many trees useful as resin producers. The agency did not allow deviation from the approved silivicultural method. This example of inflexibility in working with cooperatives contributes to negative perceptions of the agency. Said one *resinero*, "They change things for the loggers, but they don't think the poor people are worth considering." Regardless of what AFE/COHDEFOR does, the cooperative is likely to overcome the challenges produced by the new plan.

Villa Santa shows other positive aspects of integration. Prior to the *gorgojo* outbreaks, the cooperative had a rational method of integrating resin tapping with logging. When the cooperative planned to harvest in someone's resin plot, the *resinero* was paid 40 Lp. per cubic meter of wood harvested from the plot. This monetary compensation for potential losses to the *resinero* appeals to a sense of fairness among most the *resineros*. Most *campesinos* are not used to being treated fairly, but they respond in a positive manner when it happens. Instead of saying that earnings from logging are distributed among all the cooperative members, the benefits go to those who

are making sacrifices. This approach and that of Protección have much potential for mediating the conflicts that arise when logging is introduced in resin cooperatives.

Not all members from Villa Santa thought logging was positive, though. An informant expressed his doubts over the difficulties encountered in logging versus the simplicity of resin tapping. "Logging is very problematic. Something always goes wrong. COHDEFOR makes it difficult. We should just stay with resin tapping. Resin tapping is permanent. It's our *patrimonio* (heritage)." This idealistic view of resin tapping as permanent and part of heritage was common among older informants.

At the other end of the spectrum is the experience of Cooperativa Guadalupe. The management plan and logging were viewed unfavorably by most *resineros*. *Resineros* felt excluded from participation in and contribution to the new activities that so drastically altered the cooperative. In general, cooperative members who became involved in logging were younger and more educated, while the *resineros* most isolated from logging were older members, some of whom were part of the original founding group of the cooperative. "It's a shame that these *jovenes* (young men) don't think about other people. They only want to be important. When they were children, they all wore shoes bought with resin money." Another *resinero* was openly hostile about the logging. "It's an outrage that they are allowed to cut in our plots. They never even ask permission. This is my plot. I take care of it, and it takes care of me. After they cut my trees, what will they give me? Scraps from the sawmill? Can you eat wood scraps?" This reaction deserves to be addressed, because it represents a deep division in the cooperative. One gets the impression that much of the resentment stems from the break in the cultural norms of politeness and respect. It should be remembered that plots are

viewed as private property, and that the loggers often entered plots uninvited and without asking permission. The majority of the problem may stem from this violation of cultural propriety.

Chaguite Grande and Quebrada Honda were also divided. Once the management plan was completed, most younger *resineros* left resin tapping and worked in the logging groups. Some *resineros* continued tapping through the whole drama. Now they feel vindicated in their convictions because of the bad things that happened. In Chaguite Grande, these people, the "Old Guard," influenced the cooperative and the community to simplify things and go back to the old way, focusing on resin tapping. In Quebrada Honda, the "New Guard" still prevails.

There is no black and white. The view of the Old Guard that resin tapping can go on forever without logging is just not possible. Nor is it realistic to think that these groups will drop all their old ways and embrace logging as their new bread and butter. Experiences in agricultural extension projects worldwide have repeatedly demonstrated that old ways die hard. They have also taught the lesson that new isn't always better. Fortunately, this study exhibits some grey examples that utilize communication and compromise.

RECOMMENDATIONS

Established cooperatives that seek to improve and diversify or new cooperatives just beginning can all learn from the cooperatives in this study. Their diverse histories are a wealth of knowledge that includes both positive and negative experiences.

Forest Resource Base

The physical characteristics of the forest where a cooperative works is probably not a good indicator of that group's probability of success. It is important to characterize the resource to know its potential and limitations. The forest is a piece of the puzzle, and the sum of the parts and more important than the individual pieces.

It is interesting to note that the low economic value of Cooperativa Guadalupe's forest was actually an asset because no one wanted to steal it. The cooperative was able to exist without significant tenure conflicts. In Villa Santa, the opposite was the case. Their forest contains large volumes of valuable mature timber, but the Agriculture Modernization Law prevented them from harvesting the volumes specified in their management plan. The cooperative possessed an valuable resource, but they could not benefit from it fully due to other factors.

Land Tenure

Land or forest tenure is one of the most important factors for the success of a cooperative. Forest tenure can be broken down into two components. The first component is obtaining the tenure rights for the cooperative from inception. Without the first step, nothing else can happen. The importance of this component is illustrated by

the dozens of legally recognized cooperatives in Honduras that have never harvested a single tree or sold one barrel of resin because they have not obtained forest tenure. Groups in the study obtained their rights through activism, concession, and inheritance. Obtaining forest rights for the groups that have waited patiently for a piece of forest should be a priority for FEHCAFOR, IHC, and international NGOs.

The second component of land tenure is maintaining tenure rights once they are obtained. Legal tenure status does not guarantee absolute security. The three communal forest cooperatives would appear to have the most secure tenure of the study cooperatives, but in fact they have had to fight and struggle in order to maintain their forest rights. Cooperativa Guadalupe had no formal legal rights to their forest until 1998, but they have experienced no conflict over their forest. The use of usufruct contracts is recommended to further guarantee established forest tenure for cooperatives.

The pattern of locally recognized ownership of resin plots is an important aspect of tenure. Usually *de facto* ownership is not legally recognized, but the power it gives the *resinero* is undeniable. This was especially true in Villa Santa, where the *resineros* received a legal title to their plots.

Structure and Functionality of Cooperatives

The study cooperatives exhibited almost identical structure, but there were significant differences in functionality between the groups. The most important things to consider in the way cooperatives function are communication and participation. Groups that communicate well assure that every member is informed about what is happening with the cooperative. The same is true for participation. One mechanism for increasing

communication is having cooperative assemblies more than once a year. Other options for improved communication are newsletters or posters updating members on important issues with the cooperative.

A weakness discussed in the study was the function of the Boards of Trustees. In many cooperatives, this Board does not function because the members do not know the function of the body or they lack the skills and education to carry them out. It is a risk for cooperatives to operate without functioning Boards of Trustees. An education program should be implemented by FEHCAFOR or IHC to train Boards of Trustees from the different cooperatives. The entire body of cooperative leadership, including Boards of Directors and Boards of Trustees, should also be able to participate in an educational program offering basic leadership and management skills.

Benefits for Cooperative Members and Communities

The benefits cooperative members and communities receive as a result of the cooperatives and their activities are the primary justification for the cooperatives' existence. The benefits for members include employment, cash income, credit, emergency financial support, and the opportunity to gain new skills and experience. The communities benefit from the cooperatives in the form of increased economic stability, direct or indirect assistance from the cooperative for community projects, and forest and water conservation near the communities.

Good experiences should be emphasized and can be used as examples in promoting new cooperatives or advocating issues important to existing cooperatives to

government agencies. It is unfortunate that negative examples do so much to shape perceptions, that is why the good side of the cooperatives must be displayed.

Institutional Support

This is an area in which the study cooperatives have all had difficulties. It is also an area in which the cooperatives have little real control. FEHCAFOR should continue to foster a good working relationship with AFE/COHDEFOR, but the individual cooperatives must also development functional relations with AFE/COHDEFOR and the municipalities. In the case of AFE/COHDEFOR, perhaps the best strategy is to be hopeful and pragmatic. The cooperatives should be hopeful that the agency will one day improve. They should be pragmatic in knowing what difficulties they may encounter in working with the agency. It should not come as a surprise when things are difficult. Know that the agency is problematic, and develop strategies for dealing with the challenges.

International Aid Projects

The negative experiences with aid projects related by the cooperatives are a clear indication that development agencies need to emphasize quality over quantity. The planning stages are the most important for any project. The projects should plan carefully while honestly promoting participation of the stakeholders, the cooperative or community members. *Campesinos* have ideas, and they are more capable than many people believe. They should participate and have a sense of ownership in any project. Project assistance should be flexible enough to meet the needs of the participants.

Protección's rejection of MAFOR's assistance provides an excellent example of capable decision-making. The cooperative probably saved itself from problems by rejecting MAFOR. This lesson is important for cooperatives. Offers of assistance should be discussed carefully with the entire cooperative present. If parts of a project or proposal are not acceptable, do not accept them. Ask the agency promoting the project if changes can be made as a condition for participation. If the project is not willing to change, then it may not be a good idea to work with that agnecy.

Pine Bark Beetle

The *gorgojo* outbreaks were a crisis that could not be predicted nor easily prevented. The substantial loss within the healthy forest in Villa Santa and Guadalupe will have long-term effects on those cooperatives. At the very least, their forest area will probably diminish due to invasion by farmers on the now-cleared land. The cooperatives will most certainly survive, but serious changes will affect many members. In Villa Santa's case, the cooperative will almost certainly decrease in size because of the loss of resin plots for so many members.

Resin Tapping

Resin tapping is most definitely a *patrimonio* of the study cooperatives. Most *resineros* are now second or third generation members of the cooperatives. Silviculture systems, deteriorating plot conditions, and bad market conditions are threats to the long-term sustainability of resin tapping in these cooperatives. There should be serious negotiations with AFE/COHDEFOR to make concessions on management plan standards

so that the impact felt by *resineros* is less severe. Groups like EMCAH and FEHCAFOR should also continue their search for alternative markets for resin produced by the cooperatives.

If alternative markets can be accessed which increase incomes, resin tapping can be an outstanding activity to promote for new cooperatives. It is inexpensive to begin tapping, it is simple and easy to learn, and it allows *campesinos* flexibility and independence while still providing income. After gaining experience in resin tapping, new cooperatives might diversify into more complex activities like logging.

Logging

Logging holds great promise for agroforestry cooperatives because of the potential benefits it can bring. The study cooperatives have shown both potential benefits and challenges inherent to logging. Benefits include higher income, more jobs, and new skills. It should be emphasized that logging should not be the first activity a cooperative attempts. The disadvantages of logging are the increased risks, higher investment, dependence on government institutions, and the need for specific management skills. Management skills are necessary because logging is purely business. In business, bad management means losing money. Cooperatives which want to begin logging should take the advice of Two Ears of Corn (1995) author Roland Bunch - start slow, start small. Smaller trials have less chance of failing catastrophically. Logging can also benefit resin production when older trees no longer useful for resin are harvested.

Processing and Marketing of Timber

Marketing is a necessary evil that carries its own implications. The timber market is complex and inexperienced cooperatives are likely to make many costly mistakes if they are not helped. It is important for cooperatives to share information about marketing of logs and lumber. If one cooperative loses money dealing with a buyer, there is no reason why another cooperative should have the same experience. FEHCAFOR and EMCAH can be instrumental in documenting experiences of cooperatives and distributing the information to other cooperatives.

Buying a sawmill and processing lumber adds even more risk and additional concerns on top of logging. Appropriate technology is important, since many locations are isolated or do not have electricity. Cooperatives considering a sawmill must carefully evaluate the challenges and risks first. First, specific skills are required to operate and manage a sawmill. Training may be necessary to avoid some of the growing pains associated with learning these skills. Logistics can play an important role. The supply of logs for the mill should be assured, or else the expensive sawmill will lie idle.

EMCAH can play a pivotal role in this kind of training or development. They have experience in these areas in addition to the equipment. For groups that are interested, EMCAH could bring a mill to the community and conduct training for potential workers. If the cooperative members are in agreement, the group could then proceed in purchasing a sawmill.

Integration of Logging and Resin Tapping

Resin tapping on its own is not sustainable in the long term. The condition of old resin plots in the study cooperatives provide evidence to support this. Proper silviculture can rejuvenate worn-out plots and promote new regeneration. Logging is a necessary tool for the long-term viability of resin cooperatives. Integration of both activities provides the greatest benefit for the greatest number of people. For existing cooperatives that have only tapped resin, the transition can be difficult. *Resineros* often feel threatened because they are called on to accept change and sacrifices. Logging must not create division or resentment within the cooperative. Communication, respect, and participation are critical during the transition. If people feel they are being treated fairly, there is less possibility of resentment.

The methods used by Protección and Villa Santa to work with *resineros* are excellent examples of this theory. Protección gives all the members a say in the logging decisions. The *resineros* always know when they will be affected. Villa Santa uses direct payment to compensate the losses of *resineros*. *Resineros* do not feel they are making unusual sacrifices for the benefit of others. Cooperatives must realize that both activities and all cooperative members are equally important.

Cooperatives also need better support from AFE/COHDEFOR during integration. It is important that management plans consider both timber and resin production. Cooperatives in the Social Forestry System have different needs than other forest producers. Flexibility should be available to make management plans more practical for the realities of the cooperatives.

General Recommendations

In general, AFE/COHDEFOR has not given adequate support to the Social Forestry System. Incentives do not exist for the cooperatives that operate within the law. In reality, cooperatives are penalized by following the law through increased expenses and bureaucratic red tape. FEHCAFOR and other concerned organizations need to convey this to the AFE/COHDEFOR and the government in the hope that inefficiencies can be reduced or eliminated.

There is not enough dialogue and sharing between cooperatives. Given their dispersed locations cooperative members have always worked and lived alone in their communities. The experiences presented in this study teach valuable things, but they represent only the tip of the iceberg. If active agroforestry cooperatives were to talk to and rely on each other more, they could work more effectively. Increased interaction would also create a stronger sense of unity between the groups, which is important for their survival.

CONCLUSIONS

The future of the Honduran Social Forestry System depends on strengthening and developing existing groups while promoting new ones. This study outlines many of the benefits provided by agroforestry cooperatives at the local level. At the national level, thriving agroforestry cooperatives can mean more employment, stronger rural economies, reduced deforestation, and well-managed forests. To accomplish these ends, existing cooperatives struggle to thrive within the system of cooperatives, forestry, and rural communities. They face diverse challenges: difficult bureaucratic processes, fluctuating markets, illegal competition, physical and cultural isolation, lack of education, uncertain land tenure, loss of forest land, scarce capitol resources, and natural threats to the forests they work in. The cooperatives described in the current study have succeeded in some areas while struggling in others. When improvement is the goal, failure and success are equally valuable because of the lessons learned through them.

Obtaining and defending tenure rights to their forests has been a triumph for these cooperatives. Villa Santa won their forest by defending it against exploitation from commercial loggers. Protección, Quebrada Honda, and Chagüite Grande have guarded their ancestral rights to the forest successfully against those who would take them. The cooperatives have contributed to the development of their communities through community projects and support because well-being of the community is as important to them as that of the individual. The cooperatives strive to be responsible citizens by following the law and contributing their part to village, municipal, and national organizations through fees, taxes, and contributions. Rational utilization and protection

of the forest has become a cultural heritage in these cooperatives, now marking the third generation of cooperative members who have lived and worked in the forest.

The cooperatives' expansion into new activities has been a two-edged sword, presenting advantages and disadvantages. All the cooperatives studied have developed management plans, begun logging and are involved in forest product commercialization. Two of the cooperatives now own their own sawmills and process the logs they harvest. The new activities potentially may provide increased employment, greater income, and improved forest management for the cooperatives and the communities. On the other hand, these activities pose greater risks for the cooperatives, and the institutional capacity of the groups has not been sufficient in all cases. In some cases, new activities have also caused division within the cooperatives.

Other challenges exist for the cooperatives as well. All the groups experience serious difficulties in operating within the law due to bureaucracy and politics. Prejudice against *campesino* groups and preferential treatment for commercial interests damages the groups' ability to thrive. The realities of business and operating in a market economy put the cooperatives at a disadvantage, and isolationism between cooperatives prevents sharing of experiences, which could potentially ameliorate the disadvantages of the groups.

The past histories of these cooperatives provide lessons for the future. Damage from the *gorgojo* outbreaks is a serious challenge for many agroforestry cooperatives. Drastic change and upheaval may lie in the road ahead, and survival will be determined by hard work, patience, and innovation. The challenges of today could become the victories of the future. The history of the Social Forestry System and agroforestry

cooperatives can serve as a heritage and model for rural Honduran communities. Other communities deserve the same opportunities for development and independence while protecting and using the natural resources within their reach.

NOTE

(1) Proper names of individuals have been changed to maintain confidentiality.

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Appendix. Outline for case study information on agroforestry cooperatives.

I. Information about the community or communities
   A. *Pre-cooperative History*--forest, pioneer community members, economic activities in community
   B. *Establishment of the Community*--year founded, Who were first inhabitants?, Why did they stay?
   C. *Demographics*--location, topography, villages and outlying settlements, population, access to community, livelihoods and occupations, crops and agricultural practices
   D. *Forest*--forest zones and forest types, pre-coop forest exploitation, pre-coop forest rights, wildlife, How has the forest changed?
   E. *Land Tenure*--Is the land/forest communal, national, or private? Squatters, land titles
   F. *Community Organizations and Resources*
      1. *Patronatos* or committees--structure, members, functions, projects, incomes or funding
      2. Other influencial groups--Parent-Teacher Association, Water Boards, other cooperatives
      3. Municipality--relations with municipality and support towards the community
      4. Other resources and institutions of the community--cooperatives, primary and secondary schools, churches, community centers, health centers, rural credit organizations and banks, stores and markets, water system, electricity, communication, public transportation, industry, any history about institutions

II. Information on the agroforestry cooperative or group
   A. *Antecedents*--existing pre-cooperative conditions, important pre-coop events
   B. *Founding of the Cooperative*--Why was it founded?, What year?
      1. Promotion, training, funding (usually COHDEFOR)
      2. How many founding members?, first Board of Directors
      3. Legal recognition, ID #, initial difficulties, initial production, work system, assignment of areas, early changes
   C. *Structure, Functions, and Current Management of the Cooperative*
      1. Board of Directors and Board of Trustees (sessions, members, functions, and duties)
      2. Does the coop pay a manager or forester? If not, who coordinates activities? How are accounting and records managed?
      3. How often does the coop assemble? How many current members are there? What are the costs and dues for each member?
      4. Activities--resin tapping, logging, lumber conversion, secondary conversion, reforestation, fire protection, commerce (cooperative stores, lumber or firewood sales), paid services, agricultural activities

D. *Benefits for Members and the Community*
    1. Members--jobs and income, credit (What are the interests and payments?), emergency help (deaths, sicknesses), training, experience
    2. Community--forest and watershed conservation, road and infrastructure improvement, participation and support for community projects and institutions

E. *Assets and Resources of the Cooperative*
    1. Land, buildings, businesses, equipment, tools, vehicles
    2. History and utilization of assets

F. *Forest Land Tenure*--National, communal, private, combinations
    1. Do they have a usufruct contract?--year signed, duration, contract area
    2. Contracts or agreements with property owners
    3. Does the cooperative or its members possess title(s) to the land?--area of titled land, year granted
    4. Agricultural land--titled or non-formal ownership (squatting)
    5. Control of the access and use of the forest by the cooperative-what activities are practiced in the forest, including non-forestry activities? Does the cooperative have problem with outsiders conducting illegal activities in their forest?

G. *Outside Afiliations*--FEHCAFOR, CHC, EMCAH, CICAFOC, others
    1. Membership costs and dues
    2. Membership benefits, history of coop with each group

H. *International Aid Projects*--Has the cooperative worked with any projects?, Which project did they work with and what support and training did the project offer? duration of project involvement, project personnel

I. *Management Plan*
    1. How many plans has the cooperative had? How did they pay for them and how much did they cost? Who wrote the plan, and what area does it cover? year signed and duration, silvicultural system and activities, permitted annual harvest
    2. Annual operational plans--How many years have they been used? How much did they cost and who wrote them? Were the plans carried out, and what volumes were harvested?
    3. Quality of forest--diameters, density, volumes, growth
    4. Does the community support the management plan and logging activities?

J. *Logging Operation*
    1. Logistics--felling, skidding, transportation, number of workers
    2. Costs--fellers, skidding, checkers, other workers, payments to parcel owner, transportation, payments to COHDEFOR, Municipality, or *Patronato*
    3. Commercialization and markets--buyers, prices, agreements, good or bad experiences

K. *Sawmills and Secondary Transformation*--small-scale hand-sawing, mechanical sawmills, *palilleras*, carpentry and other secondary transformation
    1. Equipment and layout (including diagram)--how many workers?,

manager or coordinator, sawyer, checker, salaries
2. Production volume and yield--What products do they produce?
3. Commercialization and markets--buyers, prices, agreements, secondary products, good and bad experiences

L. *Resin Tapping*--What tapping method is used? How long have they tapped resin, and how many coop members are *resineros*?
1. Costs and contributions--COHDEFOR, municipality, *patronato*, transportation, administration, coop funds, savings, FEHCAFOR, etc…
2. Who owns the barrels? Pick-up system for full barrels
3. How much resin does the coop and individual *resineros* produce? How many trees does each *resinero* tap?
4. Condition of the forest--How many more years of resin tapping can the forest sustain? Are there unused areas available for tapping?
5. Is the management plan compatible with continued resin tapping?
6. Cooperation or conflict between *resineros* and loggers
7. Comercialization--prices, relations with the Fondo de Resina Has the coop ever sold resin to other buyers?

M. *External Relations*--COHDEFOR, municipality, projects, other communities and cooperatives